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ON  
DISEASES  
OF THE  
RESPIRATORY PASSAGES  
AND  
LUNGS,  
SPORADIC AND EPIDEMIC.

THEIR  
Causes, Pathology, Symptoms, and Treatment.

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Dedicated

TO

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FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS,

AND LATELY


PHYSICIAN TO ST. THOMAS' HOSPITAL,

ETC., ETC.,

AS A TRIBUTE OF FRIENDSHIP AND ESTEEM

AS WELL AS

ADMIRATION FOR HIS BRILLIANT ATTAINMENTS.



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## PREFACE.

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WHEN to any subject a close attention has been paid for upwards of fifteen years of the best part of a man's life, even although it be one notoriously the most obscure, and upon which the greatest difference of opinion prevails amongst the most eminent of our profession, he may reasonably expect that the conclusions he has arrived at will be received with consideration.

With my own lungs and respiratory passages delicately sensitive to atmospheric changes, and residing in a locality peculiarly favourable for noticing the effects of these changes, it would have been a culpable omission to have cast aside such a valuable opportunity for investigating this most important and interesting subject.

In its scientific aspect it is necessarily new, it being but a few years ago—1850—that the British Meteorological Society was established ; and the highest

credit is due to the Secretary, James Glaisher, Esq., F.R.S., for its formation, and successful conduct to the present time ; for it is only by its data, and a careful comparison with others made in different localities, that subjects such as these, which involve not merely the well-doing of nations but of all mankind, are brought to light, and which it is the object of these pages, in this my particular department, humbly to develop ; and however imperfect in themselves these efforts may have been, they will, it is hoped, encourage others to follow in the same path, and thus gradually lead on to that perfection which should be our aim in this as in all other scientific pursuits.

To the medical mind the book, for so small a one, has no doubt an extensive title ; for each subject, if exhausted, would fill a volume much larger than this ; and considering how much has already been written upon them, it may seem unnecessary that there should be more. And it may be asked, why could I not give to my observations a more limited range ? In reply I can only say that my first intentions were very circumscribed ; but as I proceeded it was found that the several subjects of *causes* and their effects—that is, of the former with the symptoms and pathology—were so intimately blended, that it would have been impossible to have demonstrated the one without giving a description of the other ; and if in these

departments I have at any time availed myself of the labours of others, I trust that on each occasion they have been recognized; and with regard to the treatment or alleviation of these diseases, which should be the end and aim of all our investigations, I have been led to this by a necessary sequence,—that is, from causes to effects, and from these to their remedies; whilst with the latter I have blended the practical experience of upwards of twenty years.

Upon every subject, however, and in every part, I have aimed at brevity, keeping at the same time steadily in view the object of the work, viz. *to illustrate the causes of lung-diseases both sporadic and epidemic*, which in these climates are of all others the most frequent and fatal; and my only fear is that, from the very simplicity of these causes, they will fail to convince, yet this condition is almost invariably associated with every great and general result.

In the body of the work I have explained how I have been inductively led to my conclusions,—1st, by a constant observation of the causes of coryza, which any one, by the simplest attention, may verify for themselves; and it should be borne in mind that it is not merely the normal atmospheric changes that produce these diseases, but likewise those much greater fluctuations to which, by a somewhat artificial mode of living, we are in winter so fre-

quently exposed, viz. to a temperature considerably below the freezing point, which is often that of the external atmosphere, to 70° Fahrenheit, or 38° above, which is sometimes that of our apartments; 2ndly, that as a rule, diseases of the respiratory passages are ushered in by little or no constitutional disturbance, this being consecutive to and in accordance with the local disorder; and 3rdly, by the greater frequency of coryza compared with bronchitis, and this latter with pneumonia, the difference corresponding with the exposure of each part to the external atmosphere.

As a further proof of my proposition, the subject of pleurisy was then introduced; for of all the diseases of the respiratory apparatus this is the least frequent, and as a rule may be altogether prevented by appropriate clothing; and the reason is equally obvious, viz., that the pleural sac is entirely unexposed to the immediate contact of the external atmosphere.

Having thus to my mind, and I trust that of others, conclusively proved my proposition, that diseases of the respiratory passages are produced exclusively, or almost so, by the actual contact of the atmosphere upon the parts themselves, I directed my attention to the causes of influenza, and attempted to penetrate the hitherto hidden mysteries with respect to its origin, and I believe with a like result;



and upon hooping-cough and measles I have likewise made a few observations, and whilst upon these subjects have endeavoured to explain *the atmospheric conditions under which cholera, fever, and zymotic diseases generally are developed*; and all the reliable evidence that has been collected up to the present time, both here and in tropical countries, in which latter zymotic diseases are the most prevalent and fatal, and the well-known influence of heat in favouring the various fermentative processes by which both animal and vegetable matters are rapidly decomposed, and the evolution of poisonous gases effected, go to prove that *the great dynamic agent is an elevated temperature*, and that this, aided by moisture and a stagnant atmosphere, when combined with a local cause, is abundantly sufficient for their production without assigning as a reason anything superadded to the air of a specific or poisonous nature; and this opinion—I would say fact, so far as it is possible for a negative to be one—enunciated, so far as I am aware, for the first time, will, it is hoped, give an increased impulse to legislation upon one of the greatest questions of the day, viz. the sanitary condition of the people not merely in our towns and cities but in rural districts also; for although in hot countries, such as the plains of India and southern Europe, from the well-known intensity of both the local and general conditions which

favour the production of these diseases, we can scarcely hope ever to eradicate them entirely; yet in this and the more temperate latitudes we may, if proper sanitary laws be enjoined, consider the day as not far distant when these diseases will be almost unknown. And I will also add that the same atmospheric conditions, both general and local, under which epidemics are engendered, regulate those of *epizootics* also, and that the latter are as much under our control as the former. (See foot-note, p. 192.)

If, however, it should appear that in any case I have not conclusively proved my proposition, although I would ask for confidence in the opinions advanced, from the facts and arguments adduced in their support, yet where these are considered insufficient, I trust I may with some confidence refer to former labours in meteorological science.

For instance, on the much vexed question of *atmospheric* ozone, the chief source of which I proved *for the first time* to be the ocean, and which at the period of my writing on this subject, 1860,\* it might have been by some considered presumptuous in me to differ from the eminent German chemist, Schönbein, the discoverer of the ozone of the laboratory, and to deny any general prevalence of this principle

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\* See *On the Climate of Worthing*, first edition, pp. 35-43.

in the atmosphere; yet, after five years, a reconsideration of all the evidence adduced at that time, has so completely confirmed the opinion advanced with respect to its nature, as to leave no reasonable doubt but that it is *free chlorine* and *not ozone*; and I will venture to say that there is now scarcely a chemist or man of science of any repute, who has paid attention to the subject, who is not ready to support this conclusion.

The *humidity* of the atmosphere likewise, and its influence on the human system, were also treated of on the same occasion, and evidence adduced, which, so far as I am aware, was at that time first given to the world, which proved beyond a doubt that its abundant presence is essential to our well-doing, and from that period this opinion has been very generally accepted.

The influence on the system of *fluctuations in atmospheric pressure* was also first brought under notice; and although the value of this discovery is not likely to be great, that it has all the effects attributed to it has been clearly proved. And upon the *electricity* of the atmosphere I made some remarks shewing that results had been attributed to it which were not supported by observation.

I refer to these subjects because I am asking the profession to accept with consideration the opinions advanced on the present occasion, which for reasons

that have been given will not at all times admit of absolute proof.

Lastly, it was considered inexpedient to pass over the subject of phthisis, not only on account of its prevalence, but also because it afforded an opportunity of giving the result of my investigations upon a subject to which great attention has been paid, viz., the influence which climate and vicissitudes of the atmosphere exert upon its production, alleviation, and cure.

WALTER G. BARKER.

18, The Steyne, Worthing.  
May 1866.

# ERRATA.

Page 148, line 6, for *were* read “to”

— 174, „ 9, for *his* read “the”

— 204, „ 8, for *fibrinous* read “fibrino-”





## INTRODUCTION.

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The object of the work.—The utility of Abstract Science generally.—The practical value of Meteorological Science not only to the Physician, but to the Emigrant, the Statesman, and the Soldier.—A reference to a previous work on the Climate of Worthing.—Medico-Meteorology.—The division of Lung-Diseases into four Classes.

THE object of the present work is to bring before the notice of the profession a cause of disease which appears to have been very much overlooked, and it is believed, by directing attention to it, that a large amount of sickness may be prevented, and when disorder shall have arisen, that its effects may be counteracted, and recovery more speedily accomplished. *I refer to atmospheric vicissitudes,—a well known, but hitherto little studied source of disease.* For upwards of fifteen years the science of meteorology, and especially of that department of it termed *medico-meteorology*, from its bearing upon disease,

its causes, alleviation, and cure, has been attentively studied with a view to practical deductions in the treatment ; for however absorbing to its votaries a science may be, the age is too utilitarian to recognise its importance, unless from the pursuit of it substantial advantages shall accrue to society.\* Astronomy, for instance, would receive but little *general* attention were it not associated with the useful art of navigation ; and geology be esteemed only as an abstract study, had not its cultivation led to discoveries most valuable to mankind. The same may

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\* I would not, however, have it inferred from these remarks, that it is in any way desired to under-estimate the honourable efforts of those who cultivate abstract science from the mere love of abstract truth ; for it is to this spirit of inquiry, without any reference to results, that we owe the vast and multiplied benefits which from scientific discoveries are constantly accumulating upon us ; but merely to assert that the general recognition of the importance of any science will mainly depend upon its practical application, which, however, either sooner or later is certain to take place ; for who at the period of the discovery of electricity, which took place by the simple friction of a piece of amber, or from the experiments of Galvani upon the limbs of a dead frog, would have contemplated its wonderful and varied appliances at the present day, and that thought, quicker than time, would have been conveyed from person to person, and from region to region, however remotely situate.

be said of steam and electricity, which derive importance only from their marvellous appliances; and meteorological science is fast receiving that public consideration which its capability of extensive practical application deserves; for by it we are enabled not only to dispel a large amount of error as to the causes of disease, but also to apply a ready remedy for their cure. We are likewise enabled, through the guidance of its laws, to define with almost absolute certainty the nature of the climate of any locality, not only within these islands, but also in the several quarters of the globe, and therefore to furnish a guide to those whose object is the restoration of their health, and also to supply the emigrant with information as to the country best adapted to his constitution and resources. To the statesman and the soldier likewise it is invaluable, by enabling him to supply the most appropriate food, clothing, and housing to troops during war, as well as the means of restoring to health our veterans who have been enfeebled by long and arduous campaigns in the various climates which prevail in the vast possessions of this great country.

It is, however, to medico-meteorology, and espe-

cially that portion of it which has a relation to diseases of the lungs, that I propose, on the present occasion, chiefly to direct attention ; and although, from many and evident causes, it will be difficult on every occasion to support the opinions advanced by incontrovertible facts, still the utmost caution has been taken to offer no hypothesis which has not been the result of careful and long-continued observation ; nor will these opinions, it is believed, be opposed either to sound reasoning or the observations of others.

It may be recollected that in 1860 a small work was published on the climate of this locality, in which were embodied many of the views that are repeated on the present occasion, because the continued and careful observations that have been made in the intervening period have led to their fullest confirmation ; and in this way I have been gradually led to the cultivation of a class of diseases which, from the atmosphere being brought into contact with the delicate structures of which they are the seat, more especially exercises its influence upon them ; and it should be understood that it is to those diseases that are either produced or very

much influenced by atmospheric vicissitudes, that attention will be more particularly directed, rather than to give a systematic account of all; which, from the many able treatises that have been written upon these subjects, is quite unnecessary.

It is proposed to divide diseases of the lungs into four classes; and it is believed that by a careful study of the *causes* of these, the means applicable to their treatment will be more readily understood.

1. THOSE WHICH OWE THEIR ORIGIN CHIEFLY OR ALTOGETHER TO THE IMMEDIATE CONTACT OF THE ATMOSPHERE UPON THE DISEASED PART; AS CORYZA, OR COMMON COLD; LARYNGITIS; TRACHEITIS; BRONCHITIS; AND PNEUMONIA.

2. THAT WHICH IS PRODUCED BY THE APPLICATION OF COLD TO THE SURFACE OF THE CHEST; VIZ., PLEURISY.

3. EPIDEMIC DISEASES; AS INFLUENZA; HOOPING-COUGH; AND MEASLES.

4. THAT WHICH ARISES FROM CONSTITUTIONAL CAUSES, EITHER HEREDITARY OR ENGENDERED, VIZ., PHTHISIS.

This division, however, is purely arbitrary, for it can scarcely be said that any one of these diseases is produced by either cause singly.

## PART I.

THOSE DISEASES THAT OWE THEIR ORIGIN TO THE  
IMMEDIATE CONTACT OF THE ATMOSPHERE UPON THE  
RESPIRATORY ORGANS.

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### GENERAL OBSERVATIONS.

WHATEVER opinions may have prevailed respecting the influence of atmospheric vicissitudes as a cause of disease of the lungs, if we may judge from the dissertations of authors upon this subject, they have certainly been most vague and unsatisfactory. It would be easy to give numerous extracts in proof of this; and the reasons are obvious, viz., that nearly all who have written upon them have resided in large towns, where the normal character of the atmosphere is so completely altered by local conditions that it would be impossible to make observations generally applicable; and also because little attention has been hitherto paid by medical men to



the subject of meteorology and its bearing upon disease. Observation, no doubt, has very generally taught that a north-east wind is irritating to the pulmonary organs, and a south-west one soothing ; but there are a great variety of circumstances that alter even the character of the wind, and render that from the north-east soft and soothing, and one from the south-west somewhat irritating: for instance, the cold and irritating wind from the north-east will have its nature and effects upon the lungs completely altered by a fall of rain, which will supply the atmosphere with moisture, and prevent its desiccative and therefore irritating effect upon the lungs ; and in the spring of the year the south-west winds, usually so soft, temperate, and beneficial, can scarcely be considered equally so at this season ; for the warm waters of the Gulf-stream, which during the early winter months give almost a summer climate to the south and south-west shores of Britain and western Europe, as the spring approaches cease to produce their benign influence.\*

With these convictions I am induced to give the

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\* The influence of the Gulf-stream is thus described by Capt. Maury, late Superintendent of the United States' Observ-

result of my own observations upon this most interesting subject, which, as I have before stated, have already extended over a period of upwards of fifteen years. It is impossible, on every occasion, to bring in support of the opinions advanced, those accurate data which are justly considered necessary in all scientific investigations, for the constitutions of persons,—as to whether they be of spare or full habit, of relaxed or irritable fibre ; whether they be healthy or unhealthy, with or without tubercular predisposition ; or whether they be at rest, or taking violent exercise ; or shall have been engaged in conversation, preaching, or reading aloud in the open air, by which not only the vocal organs, but the lungs as well, are especially brought into action,—all so materially modify any influence resulting from this

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atory, in his most instructive and interesting work, *The Physical Geography of the Sea*,—"Every west wind that blows crosses the stream on its way to Europe, and carries with it a portion of this heat, which is 9° above the ocean temperature due to the latitude, to temper there the northern winds of winter. It is the influence of this stream upon climate that makes Erin the 'Emerald Isle of the Sea,' and clothes the shores of Albion in evergreen robes ; while in the same latitude, on this side, the coasts of Labrador are fast bound in fetters of ice."

*individual* cause as to render it most difficult to assign the precise amount of influence which it may have had in producing diseased action. Still it is believed that the careful investigation of it as the principal exciting cause of pulmonary disease will not be without good results.

## ON CORYZA, OR COMMON COLD.

Its Symptoms.—Causes.—Treatment.

I COMMENCE with coryza, or common cold,—inflammation of the Schneiderian membrane,—because from its being situate at the commencement of the respiratory passages, is most exposed to the influence of atmospheric vicissitudes, and also because we are enabled to have ocular evidence of the effects of these, and therefore any observing person may himself confirm the correctness of the remarks about to be made upon this subject ; and when the effects of atmospheric fluctuations upon this part of the respiratory apparatus shall have been thoroughly understood, they will be found to be at once the key to their influence on all the rest ; these effects being modified, however, according to the several parts with which the air is brought into contact, and the extent that it has been allowed to exert its influence.

*Symptoms.*—Common cold, or inflammation of the mucous membrane of the nostrils, usually commences at that portion of the membrane which lines the inferior meatus, and generally at its narrowest part, opposite the junction of the palate process of the superior maxillary bone and the horizontal plate of the palate bone. At this spot, which is often in a state of chronic inflammation throughout the winter, and therefore morbidly susceptible to the influence of atmospheric changes, inflammation almost invariably begins; characterised first by dryness and swelling of the membrane, and as a result an interruption to the free passage of air through the nostrils. From this point the disease gradually extends till it includes the whole of the membrane of the nares; and in severe cases it reaches the frontal sinuses, causing pain in the forehead; the Eustachian tube producing deafness more or less permanent; the lachrymal duct causing suffusion of the eyes; or into the pharynx, and down the œsophagus. Its more common course, however, in the downward direction, is into the respiratory passages involving the epiglottis and vocal cords, causing hoarseness and loss of voice; or even a further

extension of it from the larynx into the trachea and bronchial tubes. After a few hours, at the part where the disease commenced, secretion again begins; which, from its being scanty in quantity, is more acrid than usual, and excoriates the orifice of the nostrils. In a short time it becomes more copious and bland, and the parts being relieved by the secretion, a gradual subsidence of the inflammatory symptoms takes place; and usually, at the end of about a week, the parts are restored to their normal condition.

*Causes.*—In other localities the influence of the several winds may not be so marked as in this. It is possible that a different neighbourhood may in some degree modify their effects. Here, however, and I anticipate elsewhere within these islands, the disease is almost always produced by the local influence upon the nasal membrane of a cold and dry atmosphere, such as exists when the wind is from the east and north-east; and the two conditions, cold and dryness, seem almost essential, although in the absence of either one of these,—as when in winter the wind comes from the north-west, or in early spring even from the south-west; from both

of which directions at these seasons, the air, although cold, is well charged with moisture ; or in summer, when it is warm but dry,—when other circumstances combine, inflammation will be produced. For instance, if a person has taken violent exercise, by which the transit of air over the respiratory passages is accelerated ; or if the exposure to a pernicious atmosphere has been long continued ; or if a person from disordered health, or a strumous constitution, be predisposed to this disorder.

Exposure of the *surface* of the body to cold may by revulsion have some influence in producing disease of this in common with other internal organs ; but it is impossible to give a reason for the selection of the nasal membrane in preference to any other structure, and it is alike opposed to sound physiological deduction as well as observation ; for hundreds of cases have come under my notice, of persons suffering from this disease, who had no recollection of exposure of the feet, or any part of the surface of the body, to wet or cold ; whilst in nearly every instance where careful inquiry has been made, it was found to arise from exposure to a north-east wind, or from the reaction resulting from

the rapid alternation of temperature from this to a south-west one, or to a heated apartment. The very frequent occurrence of this disease also, whilst it is a proof of the correctness of these views, will give abundant opportunities for persons to verify it for themselves.

From wet feet and general exposure of the surface of the body to cold, people will often, as a result, have shivering, pain in the loins, and reactive fever; but this is widely different from coryza, which is never ushered in by these symptoms; but the constitutional disturbance, if there be any, is subsequent to it, and a consequence.

I would therefore ask, why associate with this disease a vague and ill-defined cause for one the effects of which may be easily understood? For, as I have explained elsewhere,\* when discussing the influence of atmospheric vicissitudes upon the respiratory organs, that whilst cold diminishes the afflux of blood to these parts, and therefore of their secretions, the effect of a dry condition of the atmosphere conjoined with cold, is to interrupt the process of

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\* Climate of Worthing, first edition, p. 59.



secretion altogether, or so diminish it as to produce that altered condition of the capillaries termed inflammation.

The functions of the skin and kidneys are vicarious, and by cold applied to the surface we can readily understand how a revulsion of blood to these organs takes place, with congestion and increased secretion ; or when this is excessive, with an arrest of it, as occurs in general anasarca, or, as it is sometimes called, inflammatory dropsy. Again, each particular organ of the body appears to have its special irritant : in the kidneys it is the urine, which from suppressed excretion from the skin, or from impaired digestion, becomes acrid in quality, and may light up inflammation ; and in the stomach, stimulating articles of food, etc., will produce gastritis ; and acrid ingesta in the intestines, muco-enteritis ; and the special irritants to the liver are the stimulating contents of the portal vein. The brain also has its special stimulant in intellectual exertions and the anxieties of life ; whilst that of the lungs and respiratory apparatus is a cold and dry atmosphere.

On the other hand, the coverings of each of these

organs seem to be especially influenced by the application of heat and cold, and vicissitudes of the atmosphere upon the surface of the body; and the effects of these appear to be strictly in accordance with the exposure of the part to external influences, for cold applied to the abdomen is the usual cause of peritonitis; to the chest, of pleurisy; and although the effects of atmospheric fluctuations may not be so evident with respect to other organs, from their protected situation, still we have sufficient proof of their influence in producing disorder, even of these; for lumbago may be considered as the result of cold applied to the loins; and meningitis, or sun-stroke, of the heat of the noon-day sun upon the vertex.

The distinctions I have thus drawn between the causes of the one class of diseases and the other, lead us at once to their appropriate remedies, such as topical depletion, and derivatives to the surface, applied over the several organs where their coverings are affected; and the grand remedy for sun-stroke is the cold douche applied to the crown of the head till the pain is relieved; but where the viscera themselves are diseased, our attention must

also be directed to the removal of the specific cause. For instance, when the functions of the kidneys are at fault, the urine should be restored to its normal state; in gastritis or enteritis, the ingesta should be especially attended to: and in diseases of the brain, cerebral exertion should be diminished; whilst in those of the lungs and respiratory passages, the patient should be placed in a condition of atmosphere the opposite to that which produced the disorder. I have thus, by way of illustration, given a hasty glance at these subjects; and whilst recommending to each its *special* remedy, I have passed by the various others which are too well known to need any notice here.

*Treatment.*—If the effect of a cold, dry atmosphere upon the epithelial cells which line the respiratory passages, be to destroy their functions,—as shewn by the arrest of secretion so characteristic of the first stage of this disorder, accompanied with destruction, to a large extent, of the cells themselves; for in the next stage, that is, when secretion again begins to be poured out, a large quantity of these are thrown off from the lining membrane of the nares, and may be seen on the examination of

this fluid by the microscope,—the most appropriate treatment, prophylactic and curative, at once commends itself, viz., to place the patient in a warm, moist atmosphere; but as it is not always easy to accomplish this, a ready substitute may be found by causing the patient to inhale the steam of hot water poured into a basin, and partly covered by the hands, leaving an aperture in them sufficient to admit the mouth and nostrils. Of the great value of this remedy I have had abundant evidence in my own person. I have been very predisposed to “colds”; and in my hands it has been a most successful remedy if used when the earliest symptoms appear, which are usually a sense of discomfort and dryness at the back of the nares. I have been accustomed to inhale this upon returning home, before passing into the warm, dry atmosphere of the heated apartment. By this simple remedy, unless the exposure shall have been long continued, and the damage to the cells considerable, the disease will be frequently arrested; but if, on the other hand, the cellular lining shall have been largely destroyed, and the structures beneath impaired, then the usual results of injury, inflammation with

increased secretion, etc., will ensue, and the disease run its ordinary course, although shortened and diminished in severity according to the judicious application of remedies. These are, a mild aperient with diluents, salines, and small doses of antimony ; the patient, at the same time, should avoid stimulating articles of food and drink, and as much as possible fresh exposure to the cause of the disorder. In two or three days, under this treatment, the disease begins to subside, and in about a week the parts are usually restored to their healthy condition.

The “*dry treatment*” recommended by Dr. Williams is very efficacious when patients can be induced to adopt it. Sometimes the *stimulating plan* may be tried with advantage, such as one or two glasses of sherry wine made into a negus, taken hot at bed-time, and the patient covered with an extra blanket during the night, to promote perspiration ; but unless in persons habitually below the healthy standard, it is hardly to be recommended, for if the symptoms are not ameliorated by it, the disorder is generally increased.

Next in succession to diseases of the nasal passages, we come to those of the larynx ; and first to :

## LARYNGITIS.

*The Acute.*—Its milder and severer Forms.—*The Sub-Acute, or Œdema of the Larynx.*—Supra-Glottic and Sub-Glottic Œdema.—*Chronic Laryngitis.*—Their Symptoms.—Causes.—Treatment.

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## I. ACUTE LARYNGITIS.

UNDER this term it is considered desirable to include those minor inflammatory disorders of the larynx which are not usually comprised in it.\* It is proposed, therefore, to divide this disease into :

1. That which affects the epithelial covering only.

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\* I have made this addition in order more clearly to illustrate the chief object for which these pages are intended, and also because the milder forms of disease of the respiratory passages greatly preponderate; but from being mild, and usually treated by the sufferers themselves, we have no statistical evidence of them; and even of those cases that come under medical treatment, when they recover, no record being made, it is impossible to arrive at a correct estimate of their prevalence. I have omitted to make this distinction when on the subject of coryza, because the structures being less vital, the diseases are of less importance; the membrane also covering the bony framework of the nostrils is so attenuated that, pathologically, it would appear quite unnecessary.

2. Those cases that are of a more serious nature, and therefore involve, to a great extent, the basement membrane upon which the epithelial cells are placed; and

3. That which not only affects these parts, but also implicates the sub-mucous, areolar tissue, producing swelling and effusion, with all that fearful train of symptoms so characteristic of the disorder.

1. *Laryngitis affecting simply the epithelial covering.*

*Symptoms.*—These are a sense of dryness in the parts, huskiness of voice; a harsh, dry cough, with slight pain upon pressure over the larynx. After a few hours, secretion again begins to be poured out, which gradually becomes more copious. This, if the proper treatment be adopted, subsides in a few days, and the parts are restored to their normal standard.

*Causes.*—The disease may be produced,—1, by an extension of inflammatory action in a case of coryza, from the mucous membrane of the nostrils to that of the larynx. 2. By atmospheric vicissitudes upon the part itself; especially in persons who are accustomed to respire chiefly through their mouth rather than their nostrils, by which the cold, dry air is brought into direct contact with the epithelial cells,



interrupting their functions ; whilst from the reaction produced by the rapid alternation of temperature to the warm, dry air of our apartments, inflammation is excited. 3. By the undue exercise of the vocal powers ; as occurs in singing, public speaking, or preaching, or even by conversation if carried on out of doors when the air is cold and dry. Preaching is a very frequent cause of this disorder.

*Treatment.*—When the cause is an extension of inflammation from the nares, the same treatment must be adopted as in coryza ; but if the steam of water be used, it should now be directed through the mouth rather than the nostrils, so as immediately to reach the part ; and the exercise of the voice should in every way be avoided, for nothing contributes so much to keep up this disease, and promote its extension to the trachea and bronchi as the exercise of the vocal organs, by which the whole of the respiratory apparatus is brought powerfully into play, and the circulation through it vastly increased ; and the same observations will apply where the disease has arisen from the influence of the atmosphere upon the part itself ; but when it is produced by the third cause, viz. from public speak-



ing, preaching, or singing, there is a double reason for avoiding the exercise of the vocal powers ; for in this case not only is the epithelial covering damaged, but the elastic tissue itself, of which the vocal organs are composed, has for a time lost its tonicity as well.

A clergyman of great talent, whose Sunday duties were of a most laborious kind (he voluntarily performing three entire services during the day), told me that by keeping the mouth quite closed during the intervals of service, and thus respiring altogether through the nostrils, so that the air might reach the larynx warmed and moistened, and therefore of an unirritating character and at the same time by carefully avoiding all conversation, and, if possible, coughing, he was enabled to perform his duties with the greatest ease ; the vocal cords, from the perfect repose given to them in the intervals, recovering their tone, and the denuded membrane its healthy condition.

2. *Where the disease involves the basement membrane.\**

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\* The distinction between this division of laryngitis and the former can scarcely be said to be appreciable, yet from the anatomical difference of the parts it has been thought desirable to make it.

In this the symptoms are identical with the latter, but in an aggravated degree. In neither, however, is the disorder sufficient to impede respiration, so characteristic of the next division of this disease.

*Causes.*—The same as the last.

*Treatment.*—Also the same.

3. *That which not only affects the epithelial lining and basement membrane of the larynx, but also the sub-mucous areolar tissue, causing the effusion of serum, lymph, and pus. It is to this disease especially, from the prominent character of the symptoms, that the term “acute laryngitis” is usually applied.*

*Symptoms.*—A person, after having been exposed to a cold, dry wind from the east or north-east; and especially if he shall have been riding on horseback, walking quickly, or taking any violent exercise, returns home, enters a somewhat heated apartment, partakes of a full meal, with perhaps some stimulating beverage, and retires to rest; is suddenly awoken in the night with a horrible sense of suffocation, which causes him to start upright in the bed. This has occurred twice to myself from riding over the Downs in an easterly wind. At this early stage the disease may be arrested by appropriate remedies,

such as an active purgative, the inhalation of the steam of boiling water, and nauseating or emetic doses of tartarised antimony ; but should it be unchecked, and effusion take place to any considerable extent, into the sub-mucous areolar tissue, causing swelling and œdema of the parts ; then the terrible train of symptoms so characteristic of the disease, begin to develop themselves, such as a husky, stridulous, clangous cough, loss of voice, tenderness in the front and sides of the larynx, and a fearful sense of impending suffocation, from which the patient is often compelled to keep in the upright position, with the head and shoulders forward ; and in a short time, frequently in a few hours, death is the consequence, the result of slow strangulation ; and when the disease takes this rapid course, there is scarcely time for general inflammatory symptoms to develop themselves.

*Causes.*—The exciting cause of this terrible malady is the same as that of the other forms of laryngitis, viz., the local influence of a cold, dry atmosphere, such as exists when the wind is from the east and north-east, upon the epithelial cells which line the respiratory passages, producing an arrest of

secretion, and thus causing congestion, inflammation, and effusion into the sub-mucous areolar tissue. The effects of these winds during the spring of the year, at which time the air is particularly dry, is very special; for the moisture having been to a large extent condensed and deposited by the low temperature of winter, and a gradual rise in the thermometer taken place, and with it an increase in the capacity of the air for moisture, a peculiarly desiccative effect upon the system is the result; and this is still greater when the wind is from the east, for when directly from this quarter it passes over the arid continents of Asia and Europe, and seems to imbibe but a very small portion of humidity in its transit over the North Sea. Still, as I before stated, when speaking of coryza, in the absence of either one of these conditions, when other circumstances combine, the disease may be lighted up; but in the few cases I have witnessed, all have occurred when the patient had been exposed either to an east or north-east wind. It may also arise from excessive exercise of the voice; and those are particularly liable to it who have previously had attacks of the disease of a sub-acute kind.

*Treatment.*—In this form of the disease, the mischief having extended to the deeper seated structures, inhalation is not so efficacious as in the milder kinds; yet when it is in its earliest stage, such as described at p. 24, it is one of our most valuable adjuvants; and if, in addition, the following treatment be adopted, we shall almost always succeed in arresting the disorder. I first give two pills composed of three grains of calomel with four of powdered scammony and four of extract of jalap, and in about half an hour an active aperient draught composed of sulphate of magnesia, senna, etc.; and a mustard plaster should be applied over the site of the larynx until considerable effect is produced. If the bowels are not quickly and copiously relieved, the draught should be repeated, or an enema administered; and when this has taken place, or we are certain that the aperients have passed from the stomach into the intestines, a quarter of a grain of tartar emetic should be administered, with some saline, every half hour until vomiting is produced, after which there should be some repose. If, notwithstanding these remedies, the disease should progress, and dangerous symptoms develope them-

selves, the most vigorous antiphlogistic remedies in addition should be adopted, such as copious blood-letting from the arm, cupping at the back of the neck, opposite the larynx; and the antimony in doses of an eighth or a quarter of a grain, with a pill containing two grains of hyd. chloridi, should be given every two hours until the disease is arrested. Dr. Horace Green, of New York, and Dr. Gibb recommend the application of a strong solution of nitrate of silver, a drachm to the ounce, by means of a camel's hair brush with a curved handle of whalebone. Finally, if symptoms of suffocation shew themselves, the operation of tracheotomy should be performed; for, by this, time is given for the effects of the other remedies, and the life of the patient frequently saved.

## II. ŒDEMA OF THE LARYNX.

This is a sub-acute variety of the latter disorder, causing an effusion, first, of serum, and if it be not arrested, of sero-purulent matter into the sub-mucous areolar tissue. The disease has been divided by Dr. Gibb into *supra-glottic* and *sub-glottic œdema*, according as it is situated above or below the true

vocal cords. He considers œdema of the glottis a misnomer, as the true glottis, or lower vocal cords, are never involved in the œdema.

1. *Supra-glottic Œdema. Symptoms.*—The peculiar feature of this disease is the great dyspnœa, the result of the effusion of serum beneath the membrane covering the upper or false vocal cords and the adjacent parts, causing an approximation of their sides; but the disease may be limited to a part or one side of the larynx only, and with this there may be but little evidence of inflammation, differing widely in this respect from the last described, in which there is intense redness of the whole mucous membrane above the true vocal cords. At first there is but little constitutional disturbance; but as the disease proceeds to a fatal termination, which may be from a few hours to a few days, the difficulty of respiration increases, with a hissing sound on inspiration; the lips become livid, the face congested, and there are all the symptoms of slow strangulation.

*Causes.*—The causes of this form of the disease are the same as the last, the difference being mainly dependent upon the class of persons in whom it



occurs, viz., those of a strumous habit and debilitated constitution, the intemperate, and those who are habitually exposed to atmospheric changes.

*Treatment.*—There are two primary remedies in this disease; one the scarification, by the aid of the laryngoscope, of the tumid parts with an instrument depicted by Dr. Gibb; and if this be not sufficient to arrest the disease, and the symptoms are urgent, tracheotomy should be performed without delay. When the scarificator has been used, a bougie half an inch in diameter, with a suitable curve, may be introduced to press out the serum, and the steam of hot water should be inhaled, to assist the discharge. After this, strong astringent solutions may be applied by means of the laryngeal fluid pulveriser, or the nitrate of silver solution used; and small doses of mercury, to promote absorption, to the extent of slightly affecting the system.

2. *Sub-glottic Œdema.*—In this disease, as its name implies, the swelling is situated beneath the glottis; is fibrous in its character, and consists rather of an exudation upon the surface than into the sub-mucous areolar tissue. It can only be detected by examination with the laryngoscope, by



which the swelling is seen beneath the true vocal cords, which exhibit a white or greyish white colour.

The prominent *symptom* is the same in this as in the latter disease, viz., great dyspnœa; but the breathing is more stridulous, and the cough more croupy.

*Treatment.*—In this disease the scarificator is not applicable, on account of the depth of the diseased part, and the nature of the effusion; but tracheotomy should be performed without delay, if the symptoms are urgent. At the same time more active antiphlogistic treatment should be adopted, as in croup and acute laryngitis.

### III. CHRONIC LARYNGITIS.

*Symptoms.*—These are, hoarseness, and sometimes almost total loss of voice, with more or less of an habitual, husky cough, a sense of soreness at the larynx; and if the organ be examined with the laryngoscope, the lining membrane will be found morbidly vascular and tumid, the redness occurring in patches, and the surface presenting a granular appearance from the enlargement of the mucous

follicles ; and after a time, if this be permitted to continue, it becomes permanently thickened, and the voice loses its facile, soft, and dulcet tones, and becomes hoarse and inharmonious. It is to this particular form of disease, especially when associated with chronic follicular inflammation of the pharynx, that the term *dysphonia clericorum*\* is applied, although it is by no means limited to clergymen, but occurs in members of the bar, public speakers, and those who are habitually exposed to atmospheric vicissitudes. Chronic inflammation also leads to ulceration, and sometimes to ossification and necrosis of the cartilages.

*Causes.*—Repeated attacks of sub-acute inflammation, from atmospheric changes ; it may also succeed to the acute disease, and is likewise produced by the excessive use of the voice and repeated attacks of dyspepsia, by which the follicles of the pharyngo-laryngeal mucous membrane become congested, thickened, and inflamed. Chronic laryngitis may also be the result of the tubercular constitution, of

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\* A reference has also been made to this subject at pp. 22-23.

syphilis, the excessive use of mercury, and of habitual intemperance.

*Treatment.*—The chief remedy, in these cases, is the topical application of a solution of the nitrate of silver by means of a camel's hair brush, in the proportion of two to four scruples to the ounce ; or the sulphate of copper, zinc, or tannin, may be used, the parts being kept as much as possible in a state of repose. The diet should also be regulated, mild aperients administered, and the preparations of iodine or iron given. Frequently a change of air to the sea-side, and repose of these organs for a few weeks, will accomplish a perfect cure without any other, or but slight remedial means.

In ordinary cases the *prognosis* is by no means unfavourable ; but when it is connected with pulmonary disease, or is of syphilitic origin, the result is generally fatal.

## LARYNGISMUS STRIDULUS.

Its Causes and Pathology.—Symptoms.—Treatment.

*Causes and Pathology.*—In by far the majority of cases I am persuaded that this disease arises from gastric irritation, and perhaps occasionally from teething; but when appearing to arise from this latter, stomach irritability is usually present as well. There is also probably a degree of laryngeal inflammation, produced by cold previously existing, by which this part becomes peculiarly liable to be affected by any cause having a tendency to produce general convulsions, which are often present in this disease, as shewn by the spasmodic contraction of the extremities. In the few cases I have witnessed, gastric irritation appeared to be the true cause; and its affecting the rima glottidis is readily explained by the irritation being first conveyed to the nervous centres through the gastric branches of the par vagum, and then by reflex action through the recurrent laryngeal, to the muscles which regulate the

aperture of the glottis. It is quite true that it may occasionally arise from other sources of irritation, as tumours pressing upon the laryngeal nerves, etc.; but the fact of general convulsions very constantly accompanying this disease, and also from these being produced in children by gastro-enteritic irritation more frequently than from any other cause, must always point to the stomach as the usual source of the disorder.

*Symptoms.*—The child is suddenly awoke during the night, or if sleeping, sometimes in the day-time, with all the symptoms of strangulation. There is great difficulty of breathing, the face becomes flushed and swollen, the lips livid, and after several abortive efforts, during which the little sufferer is brought to the verge of suffocation, a long crowing inspiration succeeds; and after a short time the child falls to sleep, as if nothing unusual had happened. These attacks, however, are very liable to recur, sometimes every few hours; and with intervals, may extend over some weeks; and not unfrequently terminate fatally, if appropriate treatment be not adopted. When a case of this disease has once been seen, it is readily recognised afterwards.

It differs from whooping-cough in being quite untended with cough, and from croup by the freedom of respiration in the intervals.

*Treatment.*—In the few cases I have witnessed, effectually unloading the bowels by two or three active purgatives, and the administration of an alkaline sedative mixture, with attention to the diet, have speedily effected a cure. If there should be any suspicion that it arises from teething, the gums should be lanced; and any other cause traced out from which it is liable to be produced. Dr. Gibb strongly recommends in this, as in whooping-cough, the dilute nitric acid.

## TRACHEITIS.

Its Varieties.—The Causes of the milder Forms, and their Treatment.—The Object of the artificial Respirator.—The severer Form, or *Croup*.—Mucous, or spurious Croup.—The Causes of both these Diseases.—Their Symptoms.—Treatment.

THIS disease, like laryngitis, may be divided into—1, That which affects the epithelial cells; 2, The basement membrane; 3, The sub-mucous areolar tissue.

*Causes*.—The two former of these diseases rarely occur primarily in adults, but generally by an extension of inflammation from the Schneiderian membrane to the larynx, and from this to the trachea; for where the structures are identical, as in mucous membranes, there is a great tendency to the diffusion of inflammatory action; or it may result from the extension of primary epithelial laryngitis to that of the trachea and bronchi; and the reason of this is obvious enough, for in coryza the air reaches the seat of the origin of the disease altogether uninflu-

enced by its transit over the warm, moist structures of the respiratory passages; and the same may be said, in a great degree, of laryngitis, when the respiration is to a great extent carried on by the mouth, as in children, and also by adults during violent exercise, or when the nostrils are not well developed. But after the air has passed these parts, which are our natural respirators,\* it becomes

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\* The object of the artificial respirator is to render the air, when it is either so dry or reduced in temperature as to be irritating in its transit over the respiratory passages, sufficiently warm and moist to be deprived of this quality; and the great desideratum in it appears to be, that whilst it accomplishes this, it should do no more; for if the temperature be too much raised, we have all the disadvantages of increased vicissitudes; for it is obvious that if by the use of the respirator the air be made too warm or moist, when this is discontinued the alternation will be more than ever felt, and that it will be a source of evil rather than of good. In making a selection, therefore, we ought to be careful to choose one that does not accomplish too much in these respects. The question also, whether the nostrils should be covered or not, is well deserving of consideration; for this is not only the organ of smell, and partly that of taste, but is also subservient to the process of respiration,—a purpose which seems to have been almost passed over by physiologists; yet I am satisfied that this is one of the most important uses, for the air that enters the apertures of the nostrils passes not entirely along the inferior meatus, but by their pecu-



altered in its character, and is warm and moist, and therefore deprived of its noxious influence. In adults, therefore, it is usually by an extension of inflammation to this structure that the disorder is lighted up. In children, however, in the same way

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liar configuration is directed upwards as well as backwards, and therefore reaches the whole of the passages and sinuses of which these organs are composed; and being commingled with the air previously occupying these spaces, and at the same time coming in contact with their extensive mucous surfaces, is rendered warmer and more humid, and therefore in a fit condition to enter the delicate structures of the larynx, where it undergoes a further preparation prior to its reaching the trachea and bronchial tubes, and by the time it penetrates the ultimate air-sacs approaches in *ordinary* respiration the normal temperature of the interior of the body. It will thus be seen that the air, before it subserves the purpose of respiration, undergoes a process of preparation analogous to that to which the food is subjected in the lacteals before it is applied to the nutrition of the system. My own opinion, therefore, is that where the nostrils are well developed, and the mouth can be kept closed whilst in the open air, respirators are not needed at all; but when this is not the case, or the lungs much diseased, and cough is excited, all that is necessary is to cover the mouth with the apparatus; but if persons are liable to coryza, and there is an apprehension of extension of the inflammation from the nares downwards, one of Cook and Williams's respirators, which is merely a piece of French merino lined with silk, and arranged in the form of a cravat for gentlemen, or neck-tie for a lady, with an elastic band at the edge, may occasionally be used.

as the more severe disease about to be noticed, it will occur primarily.

*Treatment.*—This would be the same as in coryza and epithelial laryngitis, viz. the inhalation of the steam of hot water; with, if necessary, the addition of a mustard-plaster or leeches over the upper bone of the sternum.

3. *Where the disease not only affects the structures on the surface of the trachea, but also the sub-mucous areolar tissue, constituting what is commonly called*

#### CROUP.

*Symptoms.*—I give these as I have witnessed them in a tolerably extensive practice during a period of upwards of twenty years. The disease, however, is very rare in this neighbourhood. It is usually, but not always, ushered in by the ordinary symptoms of coryza. These are soon succeeded by others which are referrible to the larynx, viz., hoarseness, loss of voice, and a stridulous, clangous cough. At this stage the respiration, although quicker, is at first but very little impeded; soon, however, succeeds the stridulous inspiration, and then the abortive, croupy cough so characteristic of

the disorder ; and when the disease extends into the bronchial tubes, the cough becomes almost noiseless ; and if at the same time the ear be applied to the thorax, sonorous and sibilant rhonchi will generally be heard, shewing that the disease is in no way limited to the trachea, as is sometimes supposed. Accompanying these symptoms there is tenderness over the region of the larynx and trachea, the child is restless, the skin hot, the face flushed, and the head thrown back, so as to put the false membrane upon the stretch, and thus to present as little impediment as possible to the transit of air. If the disease should proceed to a fatal termination, and this result is generally in proportion to the rapidity of its development, the respiration becomes more difficult and rapid, the face swollen, the eyes suffused, and the patient dies comatose ; but if, on the other hand, the life of the patient be prolonged, and the disease (if of the sthenic character) has been vigorously treated, shreds of the false membrane will be coughed up, blended with mucopurulent secretion ; and sometimes pieces of false membrane expectorated, sufficiently large to exhibit the form of the trachea, and the patient gradually recovers.

A few words upon the formation of the false membrane, the characteristic feature of the disease. This doubtless arises from the intensity of the inflammation, from its being of a more acute and phlegmonous character, and deeper seated, extending to the sub-mucous areolar tissue, and its aplastic and unorganisable nature, from being blended with the muco-purulent secretion, which is the ordinary result of inflammation of the air-tubes. The membrane extends more or less into the larynx; but from the greater diameter of this, it does not here cause an impediment to respiration; and at the rima-glottidis it is removed as fast as formed by the expulsive efforts during coughing.

There is no reason to suppose that there is anything specific in the nature of this disease, or that it is limited to the trachea, as is frequently supposed; but rather that the formation of false membrane is owing entirely to the severity of the inflammation by which plastic lymph is thrown out; and this blended with mucus, and therefore unorganisable, is allowed, on account of the feeble expulsive powers of infantile life, to remain sufficiently undisturbed to mould itself to the trachea and bronchial

tubes. This opinion is singularly supported by the greater frequency and mortality of this disease in the earlier over the later period of childhood, the muscular system undergoing increased development as the age advances. And in ordinary *bronchitis* the excess of fatality in infants over that of adults is mainly owing to the same cause, and corresponds closely with the age ; for in this latter disease, when it occurs at this period of life, the little sufferer being unable to expectorate the accumulated mucus, respiration is impeded, and the patient dies asphyxiated.

But there is another reason why this is a disease especially of childhood, and why it rarely, if ever, occurs in adults, viz., the very much smaller size of the larynx in the former than in the latter ; so that in children the air reaches the trachea but very little altered either in warmth or moisture ; whereas in adults, from the increased development of the larynx, it acts as a reservoir of warm, moist air, and the colder atmosphere in passing through it is mingled with this, and reaches the trachea very much modified in its character. The subject may be illustrated by comparing the inhaled air with a current of cold

water passing into a reservoir of warm at one aperture, and the exit of the two commingled leaving it at another. The two causes, therefore,—1st, the undeveloped character of the nares in children, from which, under exertion, they respire almost entirely through the mouth; and 2ndly, from the same condition of the larynx, the air reaches the trachea and primary bronchi almost unaltered; and hence the violent and deep-seated character of the inflammation with the effusion of coagulable lymph. It is the usual observation of mothers, “My child was out playing yesterday, as well as you are,” or some similar remark. The disease is generally observed on the same night, and unless checked by early and vigorous treatment will often terminate fatally in from twenty-four to forty-eight hours.

A far more common disease than the above is the *mucous or spurious croup* of authors. The earliest symptoms in these cases are all referrible to the larynx, and should, from the prominent character of these, be termed “the laryngitis of children.” The disease, however, if not checked, extends rapidly into the trachea and bronchial tubes; and after this differs in no way but in severity from true croup, in

which it would in many instances no doubt terminate if not vigorously treated. I have at present (1862) two children as patients, who have several times come under my notice with this disease. They are suddenly seized with stridulous inspiration, a harsh, croupy, and sometimes clangous cough. By the treatment presently to be detailed, I have invariably been able to arrest the disorder.

*Causes.*—In addition to common observation there are a variety of circumstances which establish the atmospheric origin of this disease, and give unequivocal evidence that it is produced altogether by the local influence of this upon the parts affected. For instance, it is much more frequent in the country than in towns, because children in the former are more exposed to atmospheric vicissitudes ; and also because diseases, from the healthier condition of the system in children reared in the country, are more liable to assume the sthenic form, and therefore to pour out plastic lymph. The disease is more frequent in males than in females, because even in childhood the former are more robust, and generally expose themselves more to atmospheric changes after the earliest periods of life. The frequency of



the disease also, after two years of age, decreases progressively with the increase of years ; for at the age of two, children have generally begun to use their legs, and to exercise themselves in the open air. This, therefore, is the earliest period of life at which they are exposed to atmospheric influences under muscular exertion and the use of the voice, by which these influences are so much increased. The nostrils also are not so fully developed in early childhood, and therefore children respire, under *exertion*, chiefly through the mouth ; and thus the atmosphere is brought almost unaltered, as regards temperature and moisture, into direct contact with the larynx and trachea.

With reference to tracheitis being a disease exclusively of childhood, although this is in a degree true as regards the formation of false membrane, it is by no means so in reference to inflammation ; for in cases of laryngitis in adults, the inflammation usually extends into the trachea ; and in bronchitis the trachea is generally affected previous to the bronchial tubes, and in the tracheitis of children the false membrane is in no way limited to the trachea.



With respect to the particular condition of the atmosphere under which the disease is lighted up, my inquiries have almost invariably enabled me to trace its origin to exposure to a cold, dry air. The few cases that have occurred in my practice have always taken place in the spring of the year, and with the prevalence of an easterly or north-easterly wind. I have a record of only one that commenced with a north-west wind, and this was on a hill fully exposed to the north-west; and if attention be directed to this subject by others, I am satisfied they will establish these conclusions. Still there is no doubt that in situations exposed to the north or north-west, when the wind is from these directions, that the disease will sometimes be produced; but I have never known a case when the wind has come from the opposite directions, viz. the south, south-west, or west. These opinions are supported by the circumstance of the greater prevalence of this disease in the eastern over the southern and western parts of England, in the former of which persons are so much more exposed to those conditions of the atmosphere under which the disease is usually produced.

*Treatment.*—Since the prevalence of diphtheria,\* so great has been the alarm when there has been any disorder of the throat, that an early summons has usually been given, and we have happily therefore lately had greater opportunities of seeing this disease in its earliest stages, and thus giving us a better chance of arresting its terrible progress. Upon visiting a patient, therefore, with the first symptoms, viz. the loss of voice and harsh, croupy cough,—and these two symptoms are usually present before the inspiration has become stridulous, or the respiration much accelerated,—I first give an emetic in the following form:  $\text{R Ant. potas. tart. gr. ii, syrapi 3ij, aquæ destillatæ 3vi}$ ; solve benè. For a child two years old I direct a teaspoonful, equal to a quarter of a grain of tartar emetic, to be given every fifteen minutes until full vomiting is produced; at three years, a teaspoonful and a half; and at four years, two teaspoonfuls; and as soon as the vomiting has ceased, a purgative should be admi-

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\* This was written in 1862, at which time diphtheria prevailed a good deal in the neighbourhood, although very little, if at all, in the town of Worthing. It has now ceased altogether both in the town and neighbourhood.

nistered, containing three or four grains of calomel with six or eight of compound scammony powder, followed in half an hour by a draught of senna and manna, with from one to two drachms of sulphate of magnesia. These remedies, with a mustard-plaster applied over the throat, and a foot-bath, or, if it can be had, a hot bath at about  $98^{\circ}$ , will in very many instances arrest the disorder; but if the inspiration should become stridulous, the respiration quick, and general feverish symptoms set in, and the disease therefore assume a graver form, then from two to six leeches, according to the age and constitution, should be applied over the sternum, close to its upper edge, and the bleeding permitted to continue until the countenance of the little sufferer becomes pale, or there are other indications of incipient syncope, when it should be arrested by a piece of dry lint and moderate pressure with a bandage. If this fails to arrest the disease, then the indication should be to prevent the further formation of false membrane by the exhibition of calomel conjoined with antimony. I have usually prescribed two grains of the former, with the same quantity of sugar, every three hours, and the latter in doses of one eighth of a grain in a saline mixture.

By the administration of these two remedies we prevent, as far as possible, the progressive formation of the false membrane ; and if this can be done, that which is already effused may be broken up and expectorated, and a favourable termination of the disease brought about. When, however, the false membrane has once begun to be generated, so rapid is its production, that before the mercury has had time to produce its effects, death from suffocation will often take place. In the early stages, therefore, I believe there is more dependence to be placed in the free administration of tartar emetic, short of its emetic influence ; for by this remedy we are enabled to reduce the force of the circulation, and thus to diminish the supply of blood to the parts upon which the formation of the coagulable lymph depends. Yet the administration of mercury can scarcely be considered of secondary importance, for by it we diminish the fibrinous materials in the blood ; and if the patient should survive sufficiently long for this effect to be produced, the further effusion of plastic lymph is prevented, and we may hope for a favourable termination of the case. Still if the disease have reached the second stage, notwith-

standing all our efforts, a fatal termination will generally be the result.

When the force of the pulse shall have been sufficiently reduced by the antimony, and green, spinach-like evacuations taken place from the administration of the calomel, these remedies should for a time be omitted, and alkalies substituted, for these have a powerful effect in diminishing the viscosity of the secretions from the mucous membrane ; and if the patient should appear too much prostrated, ammonia may be added, and even brandy and other restoratives administered, if the symptoms of exhaustion should assume a dangerous character.

With respect to tracheotomy, it may truly be looked upon as a forlorn hope ; nor do I consider that any rule can be laid down for its performance. It must be left entirely to the judgment of those in attendance ; for whilst we may fairly infer that there are many cases which have recovered after the operation, and therefore reported as evidence of its success, that would have got well without it, and also that it is difficult to conceive when the false membrane extends below the seat of the operation, which it usually does, that it can have any influence

in removing the impediment to respiration ; still, on the other hand, if it be a case in which there are urgent symptoms of suffocation, the remedy should be tried. One thing may at least be said in its favour, that in itself the operation is neither difficult of performance, nor dangerous in its results ; nor have I ever heard of a case in which death could be attributed to it, either immediately or afterwards ; and it is, I apprehend, to this circumstance rather than to any very sanguine hopes of benefit, that the operation is resorted to.

## BRONCHITIS.

Its Varieties.—*The milder Forms*.—Their Symptoms.—Causes.—Treatment.—*The Acute*.—Its Symptoms.—Stethoscopic Signs.—Causes.—Treatment.—A Case shewing the Value of Blood-letting.—*The Chronic*.—Its Symptoms, local and general.—Causes.—Treatment.—A Case indicating the Climates best adapted for these Cases.—*Asthma*.

OF all the diseases that affect the respiratory apparatus, this is one of the most frequent, the most varied in its results, and, from the extent of distribution of the air-tubes, one of the most dangerous. I propose, therefore, to give it that full consideration which its importance deserves; and as in these tubes there is another structure, the unstriped or organic muscular fibre, superadded, this disease will admit of four divisions, viz. :

1st. That mild form of inflammation which, as in laryngitis and tracheitis, affects simply the epithelial cells.

2nd. Where there is an extension of this to the basement membrane.

3rd. Where it involves the sub-mucous areolar tissue ; and

4th. When the unstriped or organic muscular fibre is more especially affected, constituting the disease termed Asthma ; or, when of a contagious nature, Pertussis or Hooping-Cough.

1. *That which affects simply the epithelial cells.*

*Symptoms.*—In this the chief symptoms, in addition to those described under the head Coryza, are pain and soreness of the chest, generally referrible to the sternum ; and at first a dry, hard cough, which after a few hours becomes moist and husky ; and in four or five days the disease subsides altogether.

2. *In which the basement membrane is affected.* In this the symptoms are the same, only in a more marked degree.

*Causes.*—The same as those which produce coryza, laryngitis, and tracheitis, viz. atmospheric vicissitudes ; but the air having now passed through the nares, larynx, and trachea, is very much altered in its character. It is rare, therefore, that this disease is not preceded by symptoms of disorder at these parts. The bronchial tubes are doubtless



sometimes coetaneously affected, and morbid effects produced in them ; but it is in the nares and larynx that the earliest symptoms are usually perceived, and from these parts it extends into the bronchial tubes.

*Treatment.*—When of this mild character, the same treatment should be adopted as in coryza, with the addition of counter-irritants to the chest, such as a mustard-plaster, the croton-oil embrocation, or even a blister ; the patient should also be confined to the house for a few days, and the air of his apartment kept at a moderate and equable temperature.

3. *Where it involves the sub-mucous areolar tissue, and in a degree the muscular coat as well, constituting what is commonly called*

#### ACUTE BRONCHITIS.

*Symptoms.*—This division, like the last, is generally preceded by symptoms of coryza, which are followed by hoarseness, a partial loss of voice, and an irritable, painful cough, first referred to the larynx and then to the trachea, accompanied by tenderness over these parts. In a few hours these

are succeeded by pain beneath the sternum, which is much increased on coughing. This gradually extends to one or both sides, according as one or both lungs become implicated; and in proportion to the extent and severity of the disease will be the chance of recovery. The cough is at first without secretion; but in a few hours this begins, and gradually becomes more copious. In a short time severe constitutional disturbance sets in, commencing with lassitude and pain in the loins, which is succeeded by reactive fever; viz., a quick, full pulse, a loaded, white tongue; with a hot, dry skin, and thirst. Should the disease continue unchecked, the expectoration rapidly increases; but, notwithstanding this, the muco-purulent secretion accumulates in the minute bronchi, impeding the due aeration of the blood; the lips then become livid; the pulse small, weak, and frequent, often 140 to 160 in the minute, the vital powers exhausted, and the patient dies asphyxiated. On the other hand, if the disease be promptly and efficiently treated, an early subsidence of the disorder usually takes place, the cough becomes less frequent and painful, the expectoration thicker and more opaque, the feverish symptoms

diminish, and we may generally look for a favourable result.

*Stethoscopic Signs.*—As soon as the inflammation reaches the bronchial tubes, the usual effects of this condition are produced. There is swelling of the mucous membrane and sub-mucous areolar tissue, with narrowing of the calibre of these tubes, and an arrest of their normal secretion ; and the sibilous or whistling rhonchus heard by the stethoscope will guide us to the parts where this condition exists. This state, however, lasts but a short time ; and in a few hours secretion begins, and the sibilous or dry bronchial rhonchus is succeeded by the mucous, which is either fine or coarse according as the large or small bronchi are affected, or the part over which it is heard. If the disease is about to proceed to a favourable termination, the capillary bronchial tubes are either not at all or but slightly and partially affected, and in the course of eight or nine days the disease begins to subside ; or if it should extensively affect these, death may ensue at about the same period.

*Causes.*—For the production of every disease of an inflammatory character, a degree of vital prostra-

tion seems necessary in order that capillary relaxation may take place, which is essential to the causation of those morbid changes of structure which characterize inflammation ; cold, therefore, applied to the surface of the body, both by causing a revulsion of blood to the interior, and also by lowering the vital standard generally, would favour internal congestion and inflammation, and thus *tend* to produce this disease ; but there is no reason, as I have before stated, why the lungs should be the organs specially attacked, were they not at the same time subjected to some additional irritation ; for it is necessary—unless the inflammation be produced in a part in immediate connexion with that to which the cold is applied ; or there be some well understood and definite vicarious function between one part and another—in order that inflammation may be attracted to any particular organ, that some special irritant as well should be applied to develop it ; and this irritant, in acute bronchitis, is the atmosphere.

Every medical man in an agricultural district, who has seen much of practice, must have noticed cases identical with the following. A healthy woman is in the fields early in the morning, before

the dew is off the ground, or there may have been rain during the night ; she gets wet feet, and the lower part of her dress is wet. When she returns home she is seized with shivering and dysuria, with pain and tenderness on pressure over the lower part of the abdomen. She is suffering, in fact, from inflammation of the peritoneum from the pubis to the navel. These cases usually occur late in the spring or early in the summer ; but if a person gets wet feet in the winter, and at the same time is exposed to a cold atmosphere, and especially if it be dry as well as cold, acute bronchitis or pneumonia may be the result. But although cold applied to the surface of the body be one of the causes which *favour* the production of this disease, it is by no means essential ; for a *vast majority* of the cases of acute bronchitis arise without the surface of the body or the feet being exposed to either wet or cold, but are produced *altogether* by the contact of a cold, dry atmosphere, or by the reaction caused by the sudden change from this to a warm and moist one, upon the lining membrane of the respiratory passages ; and those portions which are most exposed to its influence are the first affected, the disease rapidly

extending to the already coetaneously affected bronchial tubes, even to their capillary ramifications, and from these to the air-sacs themselves, causing pneumonia.

I have never witnessed a case of *primary* acute pneumonia. The bronchial tubes have invariably been affected previously, unless those which occur in fevers, or are the result of obstructed circulation from diseases of the heart, etc., be considered so; but these are cases of congestion rather than inflammation.

*Treatment.*—I give this as I have pursued it during a lengthened period of somewhat extensive practice. In acute cases, where the constitutional disturbance is great, there can be no doubt about the propriety of a general blood-letting,\* which

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\* One of the most marked cases, indicating the value of blood-letting in acute bronchitis, occurred to me in a little child last summer. Early in June it had an attack of measles, which passed off without any unfavourable symptoms, so that it was considered unnecessary to apply to medical advice. It left, however, a cough which was never completely removed. On the 12th the little one had been amusing itself, late in the evening, in the open air for some time, and took cold. The earliest symptoms the nurse referred to the larynx. She stated

should be carried to incipient syncope. This will relieve the more violent symptoms, and should be

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that the disorder began in the throat with a noise like that of croup. At 10 P.M. I was asked to visit the child, who was about four years old. I gave an active purge of calomel and scammony, ordered a sinapism to the chest, and an eighth of a grain of tartar emetic in a mixture to be taken every two hours till sickness was produced. After the bowels had acted freely, and the child vomited, it was somewhat relieved, and had some sleep during the night; but in the morning it got rapidly worse. At 10 A.M. I again saw it, and found the disease to be rapidly advancing, the respirations being at the time eighty in the minute, the pulse small and too quick to count, the lips were livid, and the child conscious only when roused. Two large leeches were ordered to be applied over the sternum, and the bleeding encouraged by warm cloths to incipient syncope. These abstracted a considerable quantity of blood, and the orifices bled very copiously afterwards. At 1 o'clock P.M., I visited the child again, and the improvement was the most marked I ever witnessed. The child had fainted about half an hour previous to my calling, and then the nurse stopped the bleeding, as she was advised; and the little one had just begun to rally when I made my call. At this time the respirations were reduced to little over forty in the minute, the pulse had become fuller and slower, and the skin bedewed with perspiration. I therefore ordered the dry cloth to be taken off, and the bleeding again encouraged by warm, moist ones. In two hours after, the child again shewed symptoms of syncope, and the bleeding was arrested. I saw it again at 6 P.M., the respirations were much less frequent, the breath-



followed by an active purgative, grs. iv of hyd. chloridi with grs. viii of compound scammony powder, succeeded in half an hour by an active draught of senna and sulphate of magnesia; and when this has taken full effect, it should be followed by nauseating doses of tartar emetic, to keep down the pulse, and calomel to prevent the after results. If the disease be not greatly subdued by these means, twenty leeches should be applied over the sternum; and the next day, or as soon as the febrile excitement has somewhat abated, a blister to one or both sides of the chest, according to the extent of the disease, should be applied.

I have thus given an outline of the treatment of a case of well-defined acute sthenic bronchitis. It is not usual, however, to witness one in which such active treatment is necessary. The general blood-letting may generally with propriety be dispensed with, for inflammation of mucous surfaces have a tendency to relieve themselves by an increase of

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ing altogether easier, the alarming symptoms fast vanishing, and in the morning all danger had disappeared. The sequelæ of the disease were treated in the usual way, with ultimately a perfect cure.



secretion, and this is got rid of without any permanent damage to the structures.

In pleuritis the case is different, and the greater severity of the pain appears to be one of nature's indices to shew the necessity of vigorous treatment, for the pleura being a closed sac, the effusion into it by which the inflammation is relieved is not so easily removed. There is a tendency also to the formation of adhesions and other serious sequelæ when this membrane is attacked with inflammation. When, therefore, the case is less severe, the treatment must be modified to meet it. After the gums have been made tender, a palliative system should be adopted, such as the administration of small doses of the bicarbonate of potash with some appropriate adjunct; and under this treatment the disease will gradually subside. But if after two or three weeks the secretion should still remain copious, some of the stimulating expectorants may be used, such as the compound squill pill, the balsams, ipecacuhana, etc., with a rubefacient embrocation over the thorax; and sometimes it may be necessary to give small doses of mercury, as pil. hydrarg. grs. iii, with pulv. opii gr.  $\frac{1}{4}$ ; or what I very much prefer, alterative

doses of the bichloride of mercury, with some gentian or cinchona; and after this, a change to mild, sea-side atmosphere is often most successful, especially if continued through the succeeding winter, in restoring the general health, and removing the relicts of the disease. By adopting the above plan of treatment, the cure will often be so effectual as to leave not the smallest evidence of disorder; and to accomplish this is of the utmost importance, for the disease, if neglected, is not only liable to become chronic, but also to engender that condition of the bronchial tubes called Asthma, which more than any other is caused by omitting effectually to cure it.

#### CHRONIC BRONCHITIS.

By chronic bronchitis is meant that condition of the bronchial tubes in which there is a permanent state of congestion and inflammation with increased secretion, accompanied by exalted sensibility, and susceptibility to the influence of atmospheric changes.

*Symptoms.*—The milder forms of this disease do not materially interfere with the patient's usual avo-

cations or the prolongation of life. There is simply an habitual cough with expectoration, which occur chiefly in the morning; not because there is more secretion at this time than at any other, for this is almost uniform throughout the day and night; but on account of the stimulus of sensation and the influence of the will being interrupted by sleep, the cough is less frequent; for this act, although mainly reflex in its character, is very much influenced by the will, being either restrained or brought into action by it—every one can produce the act of coughing, and in a great many instances it can be altogether controlled, although the irritation frequently excites such a powerful reflex action as to remove it entirely from the power of any individual to restrain it. An accumulation, therefore, of muco-purulent matter takes place at this time, which must be expectorated in the morning.\*

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\* I refer to the act of coughing because it is frequently a matter of great practical importance to oppose the influence of the will to that of reflex action; in other words, to moderate as much as possible the cough, and thus prevent the violent succussion, straining, and interruption to the circulation which is caused by it.

There is also dyspnoea, which is increased by any exertion, as ascending a hill, the stairs, or by conversation; because the bronchial tubes being narrowed in their calibre by the inflamed and thickened membrane, and the transit of air likewise interrupted by the accumulated mucus, it is necessary that this should be compensated by more rapid respiration. Whilst, therefore, the requirements of the system are fulfilled with tolerable facility during repose; when the circulation is quickened by exertion, and the necessity for respiration increased, the efforts made to carry on this process are often most painful and difficult, and the sense of suffocation is extreme. When the disease assumes a severer form, or it has been increased by a fresh attack of inflammation, there is in addition to the cough and difficulty of breathing more or less febrile disturbance, a quickened pulse, increased frequency of respiration, even in a state of repose, with thirst, dryness of the skin, scanty, high-coloured urine, a sense of tightness in the chest and soreness on coughing, this latter being mainly referrible to the sternum. The cough also is frequent throughout the day and night,

and the expectoration, although at first scanty, soon becomes very abundant. This, after a few days, gradually subsides if the disease be properly treated, and the attack not too severe; but if on the other hand the constitution has been weakened by repeated attacks, and the secretion is profuse, or if the patient be enfeebled by old age and the exhaustion is extreme, the muco-purulent matter accumulates in the bronchi, the lips become livid from imperfect aeration of the blood, the intellects clouded, and the patient, exhausted by the disease and the unavailing efforts to expectorate the accumulated mucus, rapidly sinks.

*Stethoscopic Signs.*—By these we are enabled accurately to ascertain the extent and severity of the disease, it being sometimes confined to one lung or a part, at others it occupies both; but when this is the case it is rare that the whole of the tubes are affected. In this disease the dry sibilant rhonchus which occurs in the early stage of the acute form is wanting; for in the former there is an habitual increase of secretion; and although this at the earliest stage is for a short time diminished, it is never altogether suppressed, and is soon suc-

ceeded by a more copious supply, which is indicated by the various rhonchi, which, from the disease occupying the larger bronchial tubes, are at first coarse, bubbling, gurgling, or cooing; but as it extends to the smaller bronchi, the râles become softer, finer, and more uniform, and sometimes there is scarcely more than a roughness of the usual respiratory murmur. It is not common for the disease to extend to the air sacs, but it sometimes does, and then there is, in addition to the above, the crepitant rhonchus, a sound similar to the rubbing between the fingers of a lock of hair close to the ear.

*Causes.*—Chronic bronchitis may be considered as the result of the unsubdued acute disease, and the acute attacks supervening upon this disorder are *invariably lighted up* either by the irritating effects of the atmosphere upon the bronchial tubes themselves or by an extension of inflammation from the nares, larynx, and trachea. As I have before stated, there is no special connection between the skin and mucous membrane of the bronchi; and I have, during a practice of upwards of twenty years, witnessed numerous cases of attacks of the acute

disease lighted up from the chronic ; and although it will sometimes happen that a general cold or the effects of suppressed perspiration will be coetaneous with an attack of bronchitis,—for the same atmospheric conditions will occasionally produce the two together ; and therefore a person seized with this disease may have in addition the symptoms of suppressed perspiration, or, as it is usually termed, inflammatory fever,—still, in the great majority of instances there will be but little constitutional disturbance until several days from the commencement, and then only to the same degree as would be produced by any other local disorder of the like extent.

My father, who died at the ripe old age of eighty-one, suffered from this disease for sixty years, and every winter or early in the spring he was accustomed to have the acute disease or an exaggerated degree of the chronic lighted up. If he got over the winter pretty well, which he sometimes did by taking great care, he was almost certain to have an acute attack in the spring, when the north-east winds prevailed ; but during the last three years of his life, when he confined himself entirely to the

house in winter, he escaped the disease. His case, which was narrowly watched during a period of many years, showed me that these acute attacks owed their origin solely and exclusively to inhaling a cold atmosphere, and especially a cold and dry one ; and if when these conditions prevailed the respiratory efforts were increased by any exertion—and this would be the corrective of cold applied to the surface of the body—such as walking quickly, ascending a hill, or conversation, the result was almost certain, and particularly if he were after exposure to enter an apartment over-heated. In his case, precisely as in coryzæ, there was but little constitutional disturbance, being neither ushered in by rigors, pain in the back, nor reactive fever ; but the disease increased from its commencement by slow degrees and reached its height from eight to twelve or fourteen days, and then, under treatment, gradually subsided, the constitutional disturbance increasing and declining with the disorder ; and this is the type of the vast majority of cases I have witnessed. The case of the little child previously referred to, is another instance of the acute disease being renewed by atmospheric changes



where the former had not been completely cured ; but if any evidence could be more convincing than another that inflammatory diseases of the respiratory passages owe their origin *solely* to the local contact of the atmosphere, or at least that the inflammation which is lighted up in these parts is directed specially to them by its coetaneous influence, it is the case of a gentleman who came to Worthing for the winter in October, 1860. For the early history of this I am indebted to my friend Mr. E. Pye-Smith, of Hackney. I extract the following from a letter sent to me when the patient was consigned to my care, and before either he or I had any thought that the case would be of sufficient value to be recorded :

“ Mr. J. C. purposes at my recommendation to winter at Worthing. When about twelve years of age, he had pneumonia of the right side, which appears to have resulted in much consolidation of its base. I have known him for eight years—always thin and phthisically disposed ; he then had a cystiform tumour over the right ribs, quite unconnected with the cavity of the chest, which I removed. He continued well. Three years and a half ago he had

rheumatic fever, and after it severe peripneumony of the right lung. It was then thought that this lung was breaking up; but he ultimately got well after a few weeks spent at Alexandria, and continued so, though this lung could only do half duty, the left compensating. However, last winter repeated exposure again caused subacute inflammation with slowly progressive consolidation of the right lung, from the base upwards; and during the late wet and variable summer\* he had evidently got worse. On his return from Deal, two months ago

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\* Were it not for the general prevalence of the opinion that a humid state of the atmosphere is pernicious in lung-diseases, which it is one of the chief objects of these pages to modify, I should hesitate to refer to this portion of Mr. Smith's note. He attributes the increase of Mr. C.'s disorder to the wet summer; but upon referring to the history of the case, which was kindly given to me by our patient's wife, and which is strictly in accordance with the one above, I find an explanation of the increase of his disorder. She states, "On the 27th of July we went to Deal, and remained there several weeks. During this time the east winds prevailed very much, and he seemed to suffer from these a good deal; his cough increased, he had copious night perspirations, and was much emaciated. He returned to Hackney on the 14th of September. Here he still continued to get worse, and it was then suggested by Mr. Smith that he should winter at Worthing."

(in August), he was plainly weaker and thinner, with rapid pulse, night sweats, and advanced interstitial consolidation of the right lung. In fact, I regard him as being now in the third stage of phthisis—that of pulmonary solidification with imminent tendency to soften. I therefore advised entire rest from the cares of his business and the mild equable air of such a place as Worthing for six or eight months to come.”

He had not been here two days before his cough improved, his night sweats gradually left him, and in ten days they were gone altogether. His appetite for food also increased, and he gained considerably in weight and strength. He went on improving up to Christmas, and I had almost discontinued my attendance. Family matters of some urgency induced him to go to London during the severe frost of last winter. He went on the 31st of December and returned on the 4th of January following. I saw him the next morning. He said, “I do not feel well; my cough has returned, and I have pain in the chest, but it is on the left side instead of the right, as before, and I feel it all over the left side.” It was quite evident he

had taken cold,\* probably on his journey from town the day before. His pulse, which before Christmas was on an average under 80, had now reached to 100 in the minute, but upon examining the chest with the stethoscope I could discover but little evidence of disorder beyond slight sibilant rhonchi. The disease, in fact, had scarcely commenced; still I felt I had a critical case to deal with, viz., a patient weakened by a previous disease with another severe one impending. I prescribed for him a mild aperient, a large sinapism to be applied over the left side and the following formula:—℞ liq. opii sedat. ℥xx; vin. ant. potas.-tart. ℥xl; liq. ammon. acet. ℥j; mist. camphoræ ℥v. Fiat mistura. Sumat 4tam

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\* I use the common phrase, “taken cold”; but I should speak with more precision were I to say it is quite evident that his bronchial tubes had been exposed to a sufficient degree of cold to destroy the vitality of their epithelial cells, and arrest their function, that of secreting the mucus which shields the respiratory passages from the irritating influence of the atmosphere; and when this takes place it is followed, first, by capillary congestion, next inflammation with pain and effusion, and as a result, swelling of the mucous membrane of the air-tubes with the sibilant rhonchus, and then the re-establishment of the secretion, which gradually increases in quantity till it reaches an abnormal degree, giving the various mucous rhonchi.

partem 6tis horis, post alvus responderit. This somewhat relieved his symptoms, and he said he felt better the next day, Sunday. On the day after this, he most imprudently went as far as the post-office, which was about thirty yards from his residence; he was away from home but a few minutes. This, however, seemed to renew the disorder, and from that time he gradually became worse. The next day mucous râles were heard all over the left side, and there was copious expectoration; the pulse was 120 and weak. What can be done in such a case? I had to subdue acute inflammation and prevent its consequences in a patient with a very weak and irritable constitution; and therefore, to support the system as well, I prescribed for him a pill composed of hydrargyri chloridi gr. i; pulveris opii gr. ss, 6tis horis, with an alkaline mixture, a teacupful of broth three times a day, a little arrowroot when he seemed to need it, and toast-water to allay his thirst. This treatment was continued with slight variation for a few days, but with no amendment of his symptoms, he gradually got weaker, and the expectoration increased in quantity. On Tuesday, the 15th, a telegram was sent to Mr. Pye-Smith to see him,

who arrived here the same evening. It was then concurred to discontinue the mercurial, to use more active means to support his system, which was now becoming exhausted; to apply a hot linseed meal poultice all over the left side, and an alkaline stimulant mixture of bicarbonate of potash and ammonia. The bronchitis had, however, I apprehend, at this time begun to extend to the right side; for the next day mucous râles were heard for the first time in the bronchi of the upper and middle lobes of the right lung, and gradually extended to the lower lobe, the original seat of the pneumonic consolidation; and, as was anticipated, the extensive bronchitic disease, involving both lungs, combined with the originally serious malady in a weakened constitution, caused him to succumb. He died on the 21st.

From the history of this case the following conclusions may be arrived at:—

1st. That the east coast is not adapted to persons with lung diseases, even in summer; and the reason is easily explained. Easterly winds prevail very much on that coast; and although they are greatly modified by their imbibing considerable moisture

during their transit over the North Sea, and therefore are less irritating, still they partake much of a dry or continental character. This must necessarily be the case when we consider the proximity of the east coast to the vast tracts of land comprising the continents of Europe and Asia, which extend from west to east over a distance of nearly eight thousand miles.

2ndly. It is cases of this kind that are so much benefited by a sojourn at well-selected places on the south coast during the summer, autumnal, and winter months, the soft and soothing atmosphere relieving the cough, irritation, and inflammation, and as a consequence the appetite improves, the pulse is reduced in frequency, night sweats cease, and the healing process commences and rapidly proceeds. In this case, phthisis was not hereditary and the tongue was tolerably clean, showing that the nutritive powers were not primarily at fault, and therefore that it was only necessary to relieve the disease, for the health to improve.

3rdly. The case has been to me one of surpassing interest, as clearly proving my proposition, viz., that it is *by atmospheric influence upon the air passages*



*and sacs of the lungs themselves that inflammatory diseases of these organs are produced*; for it should be observed that it was not in the right lung, which was consolidated throughout its lower third, and in which, also, the bronchial tubes were in a state of chronic inflammation, consequent upon the local irritation, and therefore peculiarly susceptible to an attack of the acute disease; but in the left that inflammation took place, which, since the first attack of pneumonia, and subsequent hepatisation in the right, had been doing double duty, and therefore doubly exposed to atmospheric influences, and as a consequence had undergone increased and healthy development, causing considerable enlargement of the left side and protrusion of the seventh, eighth, ninth, and tenth ribs. When Mr. C. first came to Worthing, he was in the condition so ably described by Mr. Pye-Smith; nearly the lower third of the right lung was completely impervious to the air, no respiratory murmur being perceptible; at its junction with the healthier tissue, mucous rhonchi were heard, and throughout the other portions there was only a slight wheezing occasionally, the the upper lobe being the healthiest of any, and



the left lung exhibited not the slightest trace of disease, and the only deviations from normal structure were the increased development, a louder sound on percussion and puerile respiration, and I looked most hopefully upon the case as one that I knew from observation belonged to a class which usually derive much benefit from a sea-side residence, and the unfavourable termination of it was solely due to his taking cold on his journey down from London, and I learned he indulged himself in some conversation on the road.

There is also another point worthy of notice, because it is of great practical value. The bronchitis did not begin with any very marked constitutional disturbance or local pain, but like coryza began at a particular point; and the other parts having been exposed to the same influence, although modified in degree, were predisposed to take on the same diseased action; and thus it extended, like erysipelas, from continuity of structure; the degree of this extension depending upon the severity of the attack, and the power of the constitution to resist it; and it was only as the disease increased and reached its height that there was much symp-

tomatic fever. This ought to put us upon our guard whenever we meet with a case of acute bronchitis; for in a country patient with robust health I am satisfied that a copious bleeding from the arm, or from twenty to twenty-five leeches applied to the chest, with an active purgative, and a nauseating or emetic dose of tartarised antimony, will often cut short the disease; and if it does not accomplish this, will most materially mitigate its severity.

Lastly, a few remarks may be made upon the character of Mr. C.'s case, which, when he arrived at Worthing in October, simulated in every respect tubercular phthisis, excepting the stethoscopic signs. There was great emaciation, copious night-sweats, a pulse of about 110, and weak; also cough, with expectoration sometimes streaked with blood. An objection was raised to a *post-mortem*; it cannot, therefore, be said whether there was tubercular matter deposited or not. I am inclined to believe, however, that when these diseases terminate fatally, with the usual hectic symptoms, as were present in this case when he arrived at Worthing in October, that tubercular matter is generally deposited, and that Mr. Smith was right

in considering the patient in the third stage of phthisis.

Cases of ordinary chronic bronchitis are usually treated by the administration of squills and ammoniacum, the balsams, ipecacuhana, senega, etc. ; but local applications having recently been applied with such success in diseases of the larynx, and the possibility of carrying them, by means of the fluid pulveriser, into the primary bronchi and their ramifications, would lead to the belief that in chronic lung-diseases such remedies will at no distant period receive a more general attention from the profession ; and I will venture to add that these pages, by directing attention to the *fact* that diseases of the respiratory passages owe their origin mainly to the local contact of the atmosphere upon the parts, will contribute to this result.

There is also a form of chronic bronchitis of a most intractable and dangerous nature, the result of the inhalation of irritating particles in a variety of occupations, such as needle-pointers, stone-cutters, miners, etc. The remedy for this is a discontinuance of the unhealthy occupation, or means should be adopted to remove the cause of the evil ; and

unless either the one or the other be done, the lung-tissue sooner or later is sure to be injured, and the disease to assume all the characteristics of pulmonary phthisis.

4. In which the unstriped or organic muscular fibre is more especially affected, constituting what is termed—

## ASTHMA.

Its Pathology.—Its Symptoms, general, respiratory, and auscultatory.—Its Causes.—The Treatment of the Disease and of the Paroxysms.—The Climates best suited for Asthmatics.

*Pathology.*—Asthma may be defined to be a disease which consists in a difficulty of respiration occurring in paroxysms more or less periodic, and dependent in by far the majority of instances upon an inflammatory or sub-inflammatory condition of the bronchial tubes: hence, although in some it may be difficult to discover any inflammatory lesion, and therefore is by many considered of a purely nervous character, still the exalted function of the muscular element of these tubes can scarcely be due to anything but an abnormal supply of blood; in other words, an altered nutrition of the parts. It has, therefore, been thought desirable to consider it as a division of bronchitis; yet it must be admitted that there are many cases so essentially nervous and spasmodic, and where there is so little evidence of

inflammation, as to remove them almost entirely from the rank of inflammatory diseases. In a disorder, however, in which the opinions as to its nature are so varied as this, it will be as well to endeavour to arrive at correct conclusions by an inquiry into its ultimate cause ; for by one class the disease is considered as altogether nervous, by others as entirely removed from that category, and dependent solely upon pre-existing inflammation ; and by others as partly nervous and partly inflammatory. The explanation appears to be this. The bronchial tubes, like the intestines, are supplied with organic or unstriped muscular fibres, which encircle them, and like the latter, are liable to abnormal and exalted action resulting from an exalted sensibility or irritability ; the consequence, in by far the majority of instances, of an altered nutrition of the part, caused by an attack of previous bronchitis, measles, or hooping-cough. On the other hand, there are cases in which no previous organic lesion is traceable, as when it is the result of irritating gases, the emanation of ipecacuhana, of particular plants about the period, or the hay season, or of mental emotions.

When therefore, either from previous bronchitis, measles, or whooping-cough, the fibres of the bronchi are predisposed to take on exalted action, a variety of causes, but especially atmospheric fluctuations, which under other circumstances would be totally inoperative, will bring on an attack of this disease. On the other hand, cases which are represented as purely nervous appear to me to differ chiefly in these respects,—either the cause producing them is a more powerful one, as in the instance of irritating gases; and although more special, perhaps equally so when it is produced by ipecacuhana or the emanation of hay fields; but when mental emotions are the cause, there is always an undue irritability of the nervous system generally, and of the lungs in particular, which render them liable to take on exalted action; of which we have a parallel in the instance of the mental stimulus of fear, which in the vigorous and strong is totally inoperative, in producing contraction of the circular fibres of the intestines, or of palpitation of the heart, by an agitated state of the feelings.

*Symptoms.*—1. *General.* These are of a most varied character. In one case they consist of unu-

sual drowsiness on the previous night, in another of wakefulness, in others of some dyspeptic symptom ; and the patient is generally awake in the early morning, at which period the desire for sleep is the most potent, by an attack of dyspnœa. The explanation of the attack at this period is readily given by the recumbent position favouring the return of venous blood to the right side of the heart, causing engorgement of the capillaries of the lungs ; and the necessity, therefore, of increased respiratory efforts, whilst these are impeded by the pressure of the abdominal viscera upon the diaphragm ; at the same time the stimulus of the operations of the cerebrum being wanting, reflex action, upon which the paroxysm depends, is more easily called into play.

During the fit every effort is made to relieve the laboured breathing ; the body is bent forward ; the shoulders raised and fixed, with the elbows on the arms of a chair, and the hands on the knees ; the mouth being held partially open. Whilst the body is in this position the countenance is anxious and distressed, the eyes suffused, the face pallid, and if the paroxysm be a protracted one, the circulation



becomes so interrupted that the pulse is scarcely perceptible at the wrist ; at the same time the heat of the body falls, the patient becomes bedewed with a cold perspiration, and the exhaustion is sometimes so extreme as to cause an apprehension of a fatal result.

The length of time that an attack may last varies greatly. In some cases the whole is over in half an hour, in others it will continue for several days ; but if it has taken place in the night or early morning, it usually goes off in about one or two hours, with more or less expectoration, which is occasionally tinged with blood, and subsides altogether after breakfast, leaving, however, more or less of the effects during the day.

2. *The respiratory and auscultatory Signs.*—In order to compensate for the constricted condition of the tubes and the difficult transit of air to the lungs, every effort is made by the patient, through the medium of the muscles of inspiration, to increase the capacity of the chest ; the diaphragm contracts, and, pressing upon the contents of the abdomen, causes a distension of that cavity ; whilst the walls of the thorax are fixed, and in a state of permanent

expansion ; yet notwithstanding this, respiration is most imperfectly and slowly performed, being often reduced to ten, and sometimes to nine or even eight in the minute ; the period of expiration being greatly increased, whilst that of inspiration may be but little altered. On applying the ear to the chest there is little or no respiratory murmur, for the ingress of air is so interrupted that there is none to generate it ; but sonorous and sibilant rhonchi of every variety and pitch,—being sometimes dry, but usually associated with an increased secretion of mucus, indicating that the asthma is dependent upon a sub-inflammatory condition of the bronchi,—are heard successively over the whole of the chest.

*Causes.*—These have been in some degree anticipated, when defining the pathology of this disease. They will now be reconsidered very briefly, but more in detail. As in many other diseases, they may be divided into predisposing and exciting.

1. *The predisposing.*—These may be separated into

A. *A sub-inflammatory condition of the bronchial tubes, involving not merely the surface of these, but extending to the sub-mucous areolar tissue, and espe-*

*cially to their circular fibres.* This is the cause in by far the majority of cases. It is estimated by Dr. Hyde Salter, who has written a most elaborate and exhaustive treatise on the subject, and to which, for a more lengthened exposition, I must refer my readers, to be at least eighty per cent.

B. *To a general irritability of the whole nervous system.*

c. *To a morbid sensibility of the pulmonary nervous system.*

2. *The exciting Causes.*—A predisposition once established, the exciting causes are easily recognised. They may be divided into—

A. *Local Irritants*, or those which operate through the medium of the mucous membrane of the air-passages, as *irritating gases, dust, smoke, cold air, ipecacuhana*, and the *emanations of grass fields about the period of the hay season*, etc.

B. *General Irritants*, or those which produce their influence through the nervous system, as *errors in diet, uterine irritation, a loaded rectum, cold applied to the surface of the body, mental emotions*, etc.

*Treatment.*—There is no greater evidence of the true pathology of this disease than the marked influ-

ence of the remedies that have been found most useful for its alleviation and cure. It has been before stated that at least eighty per cent. of the cases have for their origin bronchial inflammation in some form or other, leaving a sub-inflammatory condition associated with an altered nutrition and hypertrophy of the mucous, sub-mucous lining, and circular fibres ; and with this, to a morbid action of the several structures, viz., an increased secretion of mucus ; and, upon the slightest cause of irritation, local or general, to a narrowing of the tubes by contraction of their muscular fibres. The treatment, therefore, of these cases is obvious. Every effort should be made to relieve the sub-inflammatory condition of the tubes, and there is no treatment so useful as that which is found to be successful in other chronic inflammations, viz., the alkalies with small doses of mercury or the iodide of potassium, continued for two or three months successively, with counter-irritants over the thorax, and a rigid attention to diet ; the various kinds of expectorants are also sometimes useful, and after a time change of air. If a person reside habitually at the sea-side, some sheltered spot in the interior should be selected, as

to the south of the Reigate hills ; or if in the interior, a mild sea-side residence on the south coast ; for associated with the chronic inflammation there is usually a degree of constitutional debility and nervous irritability which nothing tends to remove so much as change of air. A change from the sea-side to the interior is always beneficial ; but one from the interior to the coast, especially to the south coast, is usually more so. The soft, equable, and humid atmosphere of the sea having a most soothing and salutary influence ; at first tending rather to promote secretion, and in this way relieving the turgid vessels, and abating the inflammation, at the same time by its saline constituents operating as a powerful tonic and alterative.

The above observations, however, apply solely to that condition of the air tubes which *predisposes* to the *paroxysms*, which latter, however, are the leading manifestation of the disease ; for although associated with the chronic bronchial inflammation, there may be an habitual difficulty of respiration, increased by ascending a hill, or any other kind of exertion. It is only when this difficulty assumes a paroxysmal form and is more or less periodic, that the term

*asthma* should be applied, and it is to the treatment of these paroxysms that our attention will now be directed.

*Treatment of the Paroxysms.*—In the treatment of these we should leave out of consideration for the time the organic source of the disease, and direct our attention entirely to the exaggerated effects of it, produced by some of the superadded causes which have been already enumerated, and to which our first inquiries should be directed. If it has arisen from an overloaded stomach, an emetic, as twenty or twenty-five grains of ipecacuhana should be administered in warm water, and the vomiting encouraged by free libations of this, which by unloading the stomach, removes at once the source of irritation and produces immediate relief. If, on the other hand, three or four hours have passed by, and digestion has been completed, and there is reason to believe that the paroxysm has arisen from the irritating effects of the materials of a copious and stimulating meal in their transit through the lungs from the viscera to the general circulation, then tobacco (especially if the patient be unaccustomed to its use), smoked till its peculiar sedative

influence is produced, will generally operate like a charm in relieving the distressing feelings. Due consideration should always be given to the selection of these two remedies ; for if a sedative influence merely be required, tobacco is undoubtedly the remedy, although it will usually operate as an emetic if its effects be carried sufficiently far. On the other hand, although the ipecacuhana is likewise a sedative as well as an emetic in its effects, it is for the latter object it should be used ; for sedative influence is accomplished far more effectually by the tobacco.

*Stramonium*, again, although less certain in its effects than tobacco, sometimes produces most delightful results. I have myself suffered several times from attacks of sub-acute bronchitis, attended with painfully suffocative sensations towards bedtime, which have been immediately relieved by smoking for a few minutes some cigars made from the *datura tutula*, by Savory and Moore, of Bond Street, and equally beneficial results I have known to be produced in many other cases. This species of *datura* appears to supply every want, and to be intermediate in its effects between the *datura*



stramonium, or common thorn-apple of this country, and the *datura ferox*. Messrs. Savory and Moore also prepare the same plant for smoking in the ordinary way, and in some respects this is to be preferred.

*Chloroform* is another sedative. The well-known physiological effects of this remedy in causing a relaxation of the whole muscular system would at once commend it to our consideration, and we see its influence on the muscular fibres of the iris in producing dilatation of the pupil, and practically it has been found a most useful remedy in this disease. Ten or fifteen drops placed on a handkerchief may be inhaled by an adult with perfect safety, and generally with immediate relief. No patient, however, should take it without the careful supervision of his medical attendant.

*Coffee* is another and most useful remedy. It should be given, however, on an empty stomach. If taken before digestion is finished, which is usually in about two hours, it does harm by retarding the process. In many cases no remedy is so useful as this, and as it is an agreeable and salutary beverage, it should always be tried.



*The Fumes of Nitre Paper* are sometimes also most successful in allaying a paroxysm. The paper is made by dipping ordinary blotting-paper into a *cold* saturated solution of nitre in water and drying it by the fire ; and enough may be used at a time to make the atmosphere of a room equal in density to that of an ordinary London fog.

3. *The Diet*.—There is no part of the treatment of more importance than this. There is a gentleman in this town who for years has been liable to attacks of asthma. His case was originally one of sub-acute bronchitis, leaving a chronic form of that disorder, and any provocative, such as errors in diet, breathing cold air, &c., would be sure to bring on a paroxysm. This gentleman escapes these almost entirely by dining early and taking no solid food after. His habits are these—a good and substantial but digestible breakfast at about eight ; a dinner at three ; nutritious but digestible, composed of two dishes only, meat or fish and a light pudding ; mutton is usually selected, but this, of course, can and should be varied. Tea at six, with a pipe of tobacco and a cup of coffee in the evening. The rationale of the benefit of this mode of living is the

following :—All persons who suffer from bronchial irritation with an habitual cough know that there are two periods of the day when this and the difficulty of respiration, if there be any, are the greatest. The one is on awaking in the morning, owing to the accumulation of mucus during the night, and which it is the object of the cough to remove. The other at about three hours after dinner and shortly after taking tea ; for it is at this period that the nutrient portions of the food which have been dissolved by the process of digestion and absorbed by the lacteals, are passing through the lungs in their course to the general circulation : unless, therefore, the diet be of the blandest kind, it is sure to produce cough. It usually comes on a short time after taking tea, because the latter, by its diluent effect, greatly favours the absorption of the chyle, and by its stimulating property increases the activity of the circulation. After about two hours the stimulating effect of the tea is succeeded by its sedative influence, and we have a tranquil circulation, and with it tranquil breathing ; and the patient may generally be sure of a good night's rest. With respect to the smoking, although its effects are materially

altered by habit, it is undoubtedly a great sedative to the circulation; and the smoke, by its local stimulating properties, favours the expectoration of mucus and the clearing of the tubes. It is, therefore, in every way beneficial; whilst a cup of coffee may or may not be taken, according as it is found to agree, or is agreeable.

In giving an outline of the dietetic treatment of the case, I have presented that which may be pursued with advantage in the majority of others. There is, however, so much that is exceptional in this disease, that no definite system can be adopted, some being compelled to adhere rigidly to rule, whilst the greatest latitude may be allowed to others. In all cases, however, those things which by their stimulating and indigestible character, such as pastry, cheese, bottled ales, &c., are notoriously liable to bring on a paroxysm, should be avoided. With respect to the *atmosphere and locality* best suited to the asthmatic, there is so much variety of opinion, and so much caprice in individual cases, that no rule can be laid down. A great number come to Worthing and state that they have derived the greatest benefit. There are others with whom a

sea air does not agree, at least at first; and it frequently happens that some error in diet, or the excitement caused by the change, disturbs the digestion, and the disorder is increased, which is erroneously attributed to the air being unsuitable. Dr. Hyde Salter considers the atmosphere of London and large cities best adapted for asthmatics, and to many, no doubt, it is less irritating than any other; but viewing the disease as one invariably associated with and maintained by a weak and irritable state of the constitution, a large city for a permanent residence can scarcely be recommended.

*Pertussis, or Hooping Cough*, will be treated of when we come to the third division, or epidemic diseases of the respiratory passages.

## PNEUMONIA.

General Observations.—Its Causes and Varieties.—Its Symptoms, general and local.—Its Pathology.—Diagnosis.—Treatment.

PNEUMONIA, or inflammation of the parenchyma and air-sacs of the lungs, is the last disease in this division that we shall have to describe as produced by the local contact of the atmosphere upon the part, and is the connecting link between those diseases which are dependent upon it, and that which is caused by the application of cold to the surface of the chest; and of all the diseases to which the lungs and air passages are liable, if those cases only be selected that are produced by the local contact of the atmosphere upon the part, is by far the least frequent; yet, when it does occur, is of all others the most fatal. Nor can we always so easily, as in coryza, demonstrate the connexion of atmospheric fluctuations with its production; for the air in its transit, first through the nares, then

the larynx, trachea, and bronchi, has, before it reaches the air-sacs, approximated so closely to the temperature of the body, and having also received a large increase of moisture from the surfaces over which it passes, loses entirely its irritating qualities; were it otherwise, the exquisitely delicate structures of which the air-sacs are composed would be damaged by every change in the condition of the atmosphere, and the aeration of the blood interrupted. So rare is this disease in its *primary* form—at least in this neighbourhood—that I cannot recall to my memory a single instance of it. Every case that I have witnessed, when there was an opportunity of visiting the patient early, was preceded by capillary bronchitis, and usually by coryza and ordinary inflammation of the bronchial tubes, which rapidly extended to their smaller ramifications, and from these to the air-sacs and lung structure itself. I am not now referring to the pneumonia which often accompanies typhus, and sometimes typhoid fever. This is essentially different, both in its causes and character, being dependent altogether upon the nervous and vital prostration with which these diseases are associated, leading to

capillary dilatation and effusion of serum into the parenchyma, and is essentially congestive in its character, tending to engorgement and softening, widely different from the hepatization consequent upon the effusion of lymph, which accompanies acute pneumonia. There are, however, other causes to which this disease owes its origin, which most materially modify its character, and we shall best arrive at a correct knowledge of its pathology by first giving a description of these.

The *causes*, then, of this disease are, 1, *atmospheric fluctuations*, and generally a cold, dry atmosphere, which, as a rule, affects primarily the nasal passages and bronchial tubes, and from these the inflammation extends to the air-sacs, producing acute pneumonia. As a proof of this, it usually occurs in this neighbourhood in the early spring months,\* at which season the air is generally both

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\* The figures of the Registrar-General give, for the whole of England, a somewhat different account to this, the preponderance of cases being in the autumnal months; but on the south coast, during the autumn, owing to the prevalence of south-west winds, we receive the full influence of the Gulf-stream waters, which render the air both warm and moist. There is, therefore, at this season a peculiar immunity from acute lung-

cold and dry. It is also observed to be more prevalent on the east than on the south and south-west coasts, because the former are more fully exposed to the cold and dry north-east and easterly winds, which prevail so much in the spring of the year; and Huxham observed during an epidemic that bronchitis prevailed in low, damp places, and pneumonia and pleurisy\* in more elevated situations. This

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diseases, unless the wind should suddenly change to the north, north-west, or north-east, and then attacks of acute bronchitis, passing into pneumonia, will occasionally occur; and as the winter approaches, under the influence of the reduced temperature, the same disease will sometimes be lighted up. We can also give a ready explanation why inflammatory lung-diseases prevail as much as they do in the autumn of the year. During the warm summer months, so favourable to a restoration from all pulmonary disorders associated with inflammation, the respiratory passages having become accustomed to the elevated temperature, the colder air of autumn and early winter operates with a twofold effect; therefore, notwithstanding the increased humidity at these periods, lung-diseases are very prevalent in England generally; on the south coast however, for the reasons above given, the rule does not apply; for it is during the autumnal months especially that these diseases are infrequent, although cases of coryza, extending to the fauces and upper bronchial tubes, constituting what is popularly termed "influenza," are not uncommon.

\* Pleurisy and its causes will be referred to hereafter.



also finds a ready explanation in the circumstance of the greater degree of warmth and humidity of the former over the latter, which exercise a protective influence upon the respiratory passages, and the chest disease, therefore, stops short of actual pneumonia; that is to say, the atmosphere is not sufficiently irritating to produce the severer disorder of the two; for bronchitis and pneumonia viewed in relation to their *cause* may be considered as the same disease, differing only in degree, according to the circumstances that have produced them. Any one may easily ascertain for themselves the correctness of these observations, if, whilst residing here, they will take the trouble to ascend the hills to the north of the town, to which in a great measure we owe our genial climate. They will then be able to observe as well as feel for themselves the great difference between the one atmosphere and the other. In the valley the air is much less translucent, and feels soft and unirritating to the respiratory passages; whilst on the hills it is sharp and has a tendency to excite cough. These differences may not be so evident to persons in robust health, but to an invalid suffering from lung disorder, by

which the sensibility of these organs is exalted and their susceptibility to disease morbidly increased, these varieties are of the utmost importance, and exercise a great influence not only upon the sensations, but also on the malady.

2. *Exposure of the surface of the body to cold, combined with the effects of an irritating atmosphere upon the respiratory passages themselves.*—This is both congestive and inflammatory in its nature, the primary influence being produced upon the capillaries of the pulmonary artery and vein, and may be considered intermediate in its character between congestive or typhoid pneumonia on the one hand, and acute pneumonia, or that produced by the contact of the atmosphere upon the air-sacs themselves, on the other. We have an illustration of this cause when a person in a state of intoxication falls down by the roadside, sleeps profoundly for several hours, and awakes cold and shivering. The prostration produced by the intoxicating beverage, and the congestion of internal organs, caused by long continued exposure of the surface to cold, predispose to inflammation of the viscera ; but in this case the organ which is specially attacked would appear

to depend upon other circumstances. Thus, if the urine be acrid, which it usually is on these occasions, the kidneys will probably become diseased, and there will be inflammatory dropsy. If the bowels are disordered, then inflammation will be directed either to them or their coverings, and there will be either enteritis or peritonitis ; or if the individual be of a rheumatic diathesis, then pericarditis, endocarditis, or inflammation of the fibrous tissues of the joints, may be the result. But if the atmosphere be cold and irritating, or there be chronic disorder of the lungs, then the disease will attack either them or the pleura.

3. *Prostration of the Nervous System.*—Permitting capillary distension, as occurs in typhus and typhoid fever ; this is essentially congestive in its character, and is altogether different from acute pneumonia.

4. *The Breathing of Acrid Gases and Irritating Foreign Particles.*

5. *Pleurisy.*—It is impossible for inflammation of the coverings of these organs to exist for any length of time without involving in some degree the lung structure itself ; and when a combination of these

two diseases exists the symptoms of each will be materially modified.

6. *Tubercular Disease*.—This does not necessarily produce inflammation of the substance of the lungs, but unless the deposit be arrested early it presses upon the parenchyma, and sooner or later acts as an irritant, lighting up inflammation of the surrounding structures, and leading to ulceration of the lung-tissue and softening of the tubercular matter. This subject will be referred to again when we come to phthisis pulmonalis.

*Lastly*.—*Pneumonia may be the result of Small Pox, Scarlatina, or Measles.*

*Symptoms*.—1. *General*. When the disease is one of acute sthenic pneumonia, it is usually preceded by marked chills or rigors, accompanied by languor, lassitude, and a painful sense of oppression in the chest. In a few hours re-active fever commences, characterised by a full, incompressible, and frequent pulse; a hot, dry skin; scanty, high-coloured urine; a tongue white in the centre, and bare, but red at the tip and edges, with thirst; the respiration also is rapid, painful, and laborious, amounting to thirty or forty in the minute; there is also pain in the

chest, which is usually referred to the sternum, if both lungs be attacked ; or if one, or a part of one, then to the side or part affected ; and if the pleura be at the same time implicated, the pain is more acute and lancinating. At first the normal secretion is arrested, and the cough is irritable, short, and dry. After a few hours the secretion returns, the quantity being gradually increased ; and in a day or two expectoration begins, tinged with the blood, which transudes from the minute capillaries of the lungs into the air-sacs, giving to the mucus a rusty colour. This is considered, in adults, one of the most marked pathognomonic signs of the disease, and clearly indicates that the inflammation is in the parenchyma and air-sacs ; the transudation of blood being one of nature's efforts to relieve these delicate structures. Children, however, or persons in delicate health, or during the prostration of fevers, from the peculiar viscosity of the secretion, are often unable to expectorate ; so that this symptom is altogether absent, even when extensive disease is present. The respiration, which was at first attended with an increased expansion and elevation of the chest, is now carried on almost solely by the dia-

phragm; the parietes of the thorax remaining nearly unmoved, if both lungs be affected; or if one only, then the side which is diseased is inactive. The patient also lies on the affected side in order that it may be kept as quiescent as possible during respiration, and at the same time to give free movement to the other; but if both lungs be diseased, then the position is supine. As the disorder advances, the countenance, which was at first flushed, becomes turgid, the lips livid, the respiration quicker, and the tongue loaded with a thick white fur; and if the disease be about to proceed to a fatal termination, this becomes dry, the patient delirious, the respiration rapid, often amounting to fifty, or sometimes to even sixty in the minute; the pulse is quick and thready; and lastly, the vital powers failing, the patient is unable to expel by coughing the viscid muco-purulent secretion, which is often more deeply tinged, and of a darker colour, from being largely commingled with the now imperfectly oxygenated blood. If active treatment be adopted, such as will be presently detailed, the more urgent symptoms are generally at once relieved, and the malady frequently cut short, so that in favourable

cases an amendment will take place in three or four days ; the pulse becomes reduced in frequency, the skin moist, the dyspnœa less urgent, and the cough less frequent ; the sputa also loses its coloured and viscid character, and becomes more copious and opaque, shewing that the disease of the parenchyma has greatly subsided, and the inflammation receded, for the most part, into the bronchial tubes, where, as before stated, the disease usually begins, or is at least coetaneous with the pneumonia ; the latter being consecutive or superadded to the bronchitis, and evincing merely a greater severity of the inflammation and an extension of it to parts anatomically different. In the bronchial tubes the inflammation will often continue for some time, rendering the lungs peculiarly sensitive to atmospheric changes, and the disease liable to be renewed.

2. *The local or physical Signs.*—In its very earliest period there is an arrest of secretion, and from the congestion of the vessels in and around the air-sacs and minute bronchial tubes their calibre is narrowed, and the resistance to the transit of air being increased, the respiratory murmur is louder and rougher than natural. In a short period secretion

again begins, and then the air, during inspiration, in passing through the viscid mucus secreted in the minute bronchi and air-sacs, produces the crepitating rhonchus so characteristic of pneumonia. This is heard at first only at the commencement of inspiration, but subsequently extends to the whole period of the respiratory movements, and afterwards is heard only at the end of inspiration and the beginning of expiration. As the crepitation increases, the normal sound of respiration diminishes ; and as consolidation advances, both the respiratory murmur and crepitation cease altogether, and are succeeded by another class of signs, the result of the hepatized condition of the lung. These are—

1. *Dulness on percussion*, which is greater or less in proportion to the degree and extent of the consolidation ; for it is seldom that this is so complete in any part but that portions will float in water ; and even when this is the case, the dulness is frequently marked by the resonance of parts beneath.

2. *Bronchophony*, or the sound of the voice, which from the good conducting power of the hepatized lung is heard wherever the disease has extended.



3. *The vocal fremitus*, the solid lung conveying the vibration of the voice to the parietes.

4. *Immobility of the chest at the part affected*; for the hepatized lung being impervious to the air, remains unaltered during respiration, and ceases therefore to elevate the parietes.

If the disease should proceed to *suppuration*, there may be the mucous rhonchus with the expectoration of pus or muco-puriform matter tinged with blood; or in broken down constitutions it will frequently be like prune-juice or liquorice-water; but often the expectoration gives little or no evidence of the condition of the lungs, and we must be guided rather by the duration of the disease and the general symptoms, which are all indicative of great prostration of the vital powers.

In *pulmonic abscess*, again, there is little or no evidence from the expectoration till the abscess bursts and the matter finds its way into the bronchi. The sputum then suddenly becomes copious and distinctly purulent or muco-purulent; and there is the coarse, bubbling, or mucous rhonchus in the tubes leading to the cavity, and all the signs of a tubercular excavation.

If any portion of the lung becomes *gangrenous*, this is evidenced by the sputum assuming a sanious, fetid character, and by sloughy portions of lung-tissue being mixed with the expectoration, which is very evident with the aid of the microscope ; and by the rapid prostration of the vital powers, so that the patient is unable to expectorate the mucus which accumulates in the bronchi, and he quickly succumbs.

*Pathology.*—In the *first stage*, as in acute bronchitis, there is an arrest of secretion, from the epithelial lining of the air-sacs and alveoli, leading to engorgement of the capillaries and thickening of the parenchyma, constituting the *second stage* ; and if the disease be not subdued by active treatment, this is succeeded by the transudation of lymph into the air-sacs, which is at first thin and serous, but gradually becomes thicker, and is accompanied by the extravasation of blood, from the rupture of the delicate walls of the vessels giving a rusty-red colour to the expectoration ; the exudation increases rapidly, rendering the lung sufficiently solid to sink in water, constituting the *third stage*, or what is termed *hepatization*, from its presenting in density somewhat

the character of liver. In this condition it sometimes assumes a granular, at others a more uniform aspect, depending upon the relative amount of vascular engorgement, or the deposition of lymph. Occasionally the consolidation is imperfect, the blood remaining fluid, and the lung, therefore, assuming more the appearance of the spleen than the liver. This condition has been termed *spleni-zation*.

The *fourth stage* is that of yellow or grey hepatization, which consists in the conversion of the exudation into pus-corpuscles, which are usually diffused throughout the lung, and seldom possessing the well-defined boundary of an abscess; this, however, sometimes exists, exhibiting an evident solution of the tissues, and circumscribed by the effusion of coagulable lymph.

Finally. Gangrene may accompany and succeed to suppuration.

*Diagnosis.*—There are two symptoms which are characteristic of pneumonia,—1st, the fine crepitation, accurately compared by Dr. Williams to the sound produced by rubbing a lock of hair near the ear, slowly and firmly between the finger and

thumb; 2nd, the expectoration of a rusty-coloured mucus. And when these two exist together there can be no doubt about the nature of the disease. The first, however, is liable to be masked by the fine mucous rhonchus, indicating coetaneous inflammation of the minute bronchial tubes, with which the disease is, I believe, always associated, and generally preceded by it; and in the pneumonia of children there is usually no expectoration, their muscular powers being insufficient to expel the viscid mucus; so that in these we must be guided in the early stage solely by the crepitation and general symptoms. In the second stage there is, in addition, the dulness on percussion, the bronchial respiration, and vocal fremitus. It may be distinguished from pleurisy by the pain, which in this is acute and lancinating, whilst in pneumonia it is obtuse and oppressive; and in the second stage, by the dulness on percussion being altered in its position by a change in the posture of the patient in pleurisy; whilst in pneumonia it is unaltered. From bronchitis it is known by the rougher character of the rhonchi and the absence of the rusty tinge in the expectoration.

*Treatment.*—I give this as I have practised it during a period of upwards of twenty years. If the patient be robust, and the disease acute, the principal remedy, and the first that should be used, is bleeding from the arm, from a rather large orifice, and carried to incipient syncope. There is no disease to which the body is liable in which copious blood-letting is so useful as this. As soon as the patient has rallied a little, from five to eight grains of calomel, with ten of scammony, should be given, and followed by an aperient draught of sulphate of magnesia and infusion of senna. When this has taken effect on the bowels, which it usually does in about two hours, if the operation be promoted by a little warm tea, I begin with tartar emetic in half-grain doses with a saline. In about two hours this should be succeeded by a pill of calomel and opium, in the proportion of about four grains to one; and these remedies continued alternately. It is desirable that the first two or three doses of the antimony should cause vomiting; for I cannot but associate the rapidly beneficial results of this remedy with its nauseating and emetic effect upon the system; for during this, the heart's action is reduced

in force and frequency, the capillaries unloaded, and the skin bedewed with a copious perspiration. Every one who has witnessed the act of vomiting must have noticed these effects; and when we consider the highly vascular character of the pulmonary organs, and that the blood of the whole body passes from the heart directly and immediately through these, and that the special seat and nature of this disease at its origin, consists in engorgement of the capillaries of the pulmonary artery and vein, we can readily understand how any remedy that produces a powerful effect upon the organic nervous system, and through this upon the heart's action, should have a beneficial influence upon it; and to this cause, I believe, we must mainly attribute its great utility. Still there is a great deal of good effected by this remedy, which physicians are unable to assign to this cause, and it is therefore referred to its specific action upon the inflamed vessels. We have no evidence, however, of this. Physiology teaches us that materials *normally* present in the blood have a special affinity for, or are attracted to, particular organs, constituting the processes of secretion and excretion; and substances introduced

into it are attracted to, and eliminated by, these ; as the balsams, etc., by the genito-urinary and pulmonary mucous membranes ; and during the process of elimination, by their irritant action stimulate the capillaries, cause their contraction, and bring the parts to a healthy condition. But if this were the effect of tartar emetic, by its stimulant influence it would be pernicious instead of beneficial in the early stages of an inflammation. Its operation appears rather to be that of an irritant upon the stomach and intestinal canal, causing vomiting and increasing the action of purgatives ; and after this has ceased, like many other irritant poisons introduced into the stomach, produces, through the medium of the great sympathetic, a powerful sedative influence upon the heart's action ; and by reducing the circulation of the blood through the lungs, relieves the congestion and inflammation of the pulmonary vessels ; for it should be recollected that the remarkably beneficial effect of this remedy is limited altogether to the first and second stages of the disease, or the first stage of Laennec ; that is, when the capillaries are merely in a state of congestion or incipient inflammation, and before consolida-



tion of the effused lymph has taken place. At this period, when conjoined with the other remedies, its effects are often most marvellous; and even after effusion has taken place, by lowering the impetus of the circulation, and thus removing the plethora of the vessels, will cause its re-absorption. The remarkable effect of this remedy upon the disease is thus readily accounted for; nor do I think there is any need to look to a specific action upon the inflamed vessels for an explanation.

The effect of mercury is altogether different. The influence of this is upon the blood plasma itself, preventing its consolidation and organization, and thus permitting the effusion to be re-absorbed, and the parts restored to their healthy condition; whilst the opium allays pain and nervous irritation, and prevents the calomel from passing off by the bowels.

By the combination, therefore, of these remedies, —1st, the bleeding to diminish the volume of blood generally, and the congestion of the diseased vessels; and if this be carried to syncope, the effect is much increased; for during this, the heart's action having almost ceased, and the capillaries having emptied themselves of their contents, frequently contract to



their normal calibre. Thus in this disease more than in any other to which the human system is liable, a copious bleeding is most useful, and should be repeated if urgent symptoms appear to demand it. 2. The active purgative, by which a large quantity of fluid is carried off from the system. 3. The antimony, to keep down the impetus of the circulation; and lastly, the opium and calomel, the first to relieve pain and irritation, and the second to prevent the after results of the inflammation,—we may generally place the patient in a state of security, and often bring about a speedy restoration to health. The other remedy is local depletion by leeches, which, if the pneumonia be near to the surface, and appears from the severity of the pain to involve the pleura, is often of the greatest service.

In the third stage, or that of consolidation (the second of Laennec), the main object is to remove this by the steady administration of calomel and opium until the gums be affected; and after this has been accomplished, the patient should be kept under the influence of the mineral for some time, either by the same preparation in smaller doses, or by some other, as the hyd. c. creta, or the bichloride.

I have for a long time been accustomed to use the bichloride, in a great variety of chronic inflammations where mercury is applicable; for of all the preparations of this metal, I consider it to be the most manageable and certain in its effects, and when given in moderate doses rarely disorders the bowels or produces constitutional disturbance.

Whilst this is being administered, a sedative mixture of morphia, opium, henbane, or poppies, conjoined with an alkali, should be given to allay the cough, and aid the resolvent effect of the mercury; and after a time some of the expectorants, as squill, ipecacuhana, senega, or ammoniacum, may be added. These, however, often appear to irritate and increase the cough, although sometimes they are very useful. The hydriodate of potash, conjoined with a bitter, is also a valuable remedy after the febrile symptoms have subsided, and the system appears to need support; but whilst using these remedies, counter-irritants, such as blisters, tartar emetic, ointment, etc., must not be omitted. These, by diverting to the surface, are most beneficial in allaying the cough and chronic inflammation.

Lastly, after the more prominent symptoms have

been subdued, change of air to the sea-side is most useful in removing the sequelæ. It is in these cases of lung-disease especially that a residence on the south coast is so beneficial; the soft, mild, and humid atmosphere of the ocean soothing during inspiration the irritable lung, and thus relieving the cough and chronic inflammation with which the consolidation is generally associated; whilst the various constituents, saline and mineral, of a sea-side atmosphere, by their alterative and tonic effect upon the system, contribute most materially to remove the hepatized condition of the lung, and improve the general health. From the great benefit I have witnessed in these cases there are many, I am satisfied, that are prevented from becoming tubercular in their character from a residence at an appropriate spot on the south or south-west coast. Nor do I think that medical men residing in the interior, and particularly in our great inland cities, even yet thoroughly appreciate the advantages to be derived from the change. And this benefit is quite as great in summer as in winter; for as I have stated in my book on Worthing climate, in the former the air is comparatively cool, and in the latter warm.

In the third or suppurative stage, which is sometimes ushered in by rigors, and always associated with great prostration of the vital powers, our great object should be to support the system by broths and nutritive food, quinine or bark, ether and ammonia, wine or brandy, or what is sometimes most grateful to the patient, and sits well on the stomach, —rum and milk, being guided in the administration of these by the general symptoms.

Finally, if gangrene should supervene, as shewn by the fœtor of the breath, and expectoration, the nitro-muriatic acid, as recommended by Dr. Williams, may be given in addition.

The treatment of the other varieties of this disease has reference rather to the particular disorders with which they are associated. It is unnecessary, therefore, to refer to it here.

## PART II.

ON THAT WHICH IS PRODUCED BY THE APPLICATION OF  
COLD TO THE SURFACE OF THE CHEST.

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### PLEURISY.

Its Definition.—Separation into four Divisions.—Its Causes.—  
Pathology.—Symptoms, general and local.—Treatment.

PLEURISY may be defined to be an inflammation of the pleural sac ; that is, of the membrane lining the parietes of the thorax, and from these reflected over the lungs, covering also the thoracic surface of the diaphragm and the vessels at the root of the neck ; and would appear to be the only disease, and this not at all times, that can be immediately attributed to its unaided cause. For practical purposes it may be separated into *four divisions*, viz.,—

Costal pleuritis, or that which commences in the pleura lining the ribs and intercostal muscles.

Pulmonary pleuritis, which begins in that portion reflected over the lungs.

Diaphragmatic pleuritis, in that covering the diaphragm ; and

General pleuritis, the causes of which are of general or constitutional origin.

*Causes.*—1. *Costal Pleuritis.* Although there are several pulmonary disorders which are most materially *influenced* by the application of cold to the surface of the chest, and pneumonia, from being a disease which involves the most extensive capillary plexus in the whole body, and through which the blood of the entire system passes, is especially liable to be favored by any changes which affect the surface ; yet it differs from pleurisy in not being produced by the *special* application of cold to the parietes of the thorax ; and also by being, in common with diseases of the respiratory passages, most materially influenced by the local contact of the atmosphere upon the diseased part during respiration ; so that in many instances it is impossible to say whether the pneumonia be the result of the application of cold to the surface of the body, or the local influence of the atmosphere upon the epithe-

lial lining of the air-sacs and alveoli; or, what is often most probable, these two causes combined; capillary bronchitis being usually first lighted up, and the inflammation, favored by the congested condition of the capillaries of the pulmonary artery and vein, transmitted to the air-sacs; whereas inflammation of the pleura, from this membrane being a shut sac, cannot be produced by the contact of the atmosphere upon it. Disease, therefore, of the costal pleura is caused—

1. *By a revulsion of blood from the surface to the interior, by exposure of the parietes of the thorax to cold; and the most frequent cause is exposure to cold winds.* My own observation would lead me to assert that pleuritis costalis is quite as prevalent in the autumn and winter as in the spring, and is invariably produced by a change of wind from a warm to a cold direction, as from the south or south-west to the north, north-east, or north-west. Relative dryness and humidity of the atmosphere have no perceptible influence in producing this disorder, because the air is not brought into contact with the part affected, as in inflammation of the respiratory passages; whereas the cold, from its well-known

influence in contracting the capillaries of the surface, and thus producing a revulsion to the interior, is quite sufficient to light up the disease when the constitution, either from debility or any other cause is predisposed to inflammation. It is rare to meet with this disorder in summer, although sudden atmospheric changes, or exposure at night, will sometimes cause it even at this season.

II. *Injuries*, as violent contusions, fractures of the ribs, penetrating wounds, burns, scalds, and lacerations of the integuments of the thorax.

III. *Inflammatory and malignant diseases of the mammae*; the inflammation in these diseases often extending to the pleura, and greatly increasing the suffering.

IV. *Herpes Zoster*.—Unless this disorder be carefully treated, and a due regard paid to after results, it will frequently excite pleuritic inflammation with adhesion, causing for a long time great discomfort and pain.

*Lastly*, persons of a spare habit of body, and those who are insufficiently clothed, are more liable to this disease than the obese; the layer of fat, as well as clothing, offering a great protection against pleuritic inflammation.



2. *Pulmonary Pleuritis*.—The most common cause of this, in its primary form, is—

I. *The extension of inflammation from the pulmonary parenchyma*.—Hence, as pneumonia, bronchitis, and other diseases of the respiratory passages, are most common in the spring of the year, so proportionately is pleuritis pulmonalis.

II. *Tubercles in the Lungs*.—Throughout the several stages of tubercular deposit, the pleura is usually more or less implicated, and inflammation gradually lighted up; and when this disease is associated with acute suffering, it generally arises from the pleura being involved. In the third stage of phthisis this membrane is so frequently perforated that Dr. Alison had assigned to it another; the fourth stage.

III. *The altered Condition of the opposed Surface in Pleuritis Costalis*.—At first, from preternatural dryness and roughness of the membrane, and then the irritation of the effused lymph, inflammation of the costal pleura can exist only for a short time without involving the opposing surface.

3. *Diaphragmatic Pleuritis*.—This is produced by,

I. *Inflammation of the peritoneum, or viscera contiguous to the diaphragm, and an extension of this through its substance to the overlying pleura*.

II. *By an extension of inflammation in pleuritis costalis and pulmonalis.*

4. *General Pleuritis.*—This may be produced by,

I. *An expansion of either of the above from their original seat.*—This generally takes place when the vital powers are low, and the inflammation of an asthenic character, the *aplastic* nature of the blood and its products being incapable of limiting the inflammation. In these cases, there is usually but very little pain, with a tendency to effusion, the disease assuming the form which is termed *latent*.

II. *Previous pleuritic disease, or the actual presence of inflammation in other portions of the pulmonary organs.*—These produce a general tendency to pleuritic congestion and inflammation.

III. *The suppression of cutaneous eruptions; of the urine from renal disease, or of any other accustomed discharge.*

IV. *Eruptive Fevers.*—In delicate children, or in broken down constitutions, pleurisy is a very common sequela of these; leading generally to effusion, and assuming a latent form.

V. *The puerperal State.*—In healthy towns or rural districts puerperal disease in any form is most rare,

and especially puerperal fever. Pleurisy, from this cause therefore, is very infrequent in these districts. It is more common in large cities, and when it does occur, is of a low or adynamic character, with a tendency to effusion.

VI. *Phlebitis*.—In this the blood, as in the two latter diseases, is poisoned ; the general symptoms are of a typhoid character, and the pleuritic effusion is often undetected till after death.

VII. *Pericarditis and Rheumatism*.—In pericarditis the pleura is usually more or less implicated ; and in rheumatism, if the diathesis be strong, the pleura is often affected.

*Pathology*.—In its earliest stages there is an increased vascularity and swelling of the pleural membrane, with an arrest of secretion. This, however, lasts but for a short time, and is followed by the effusion of a sero-albuminous fluid, which varies in character according to the constitution of the patient and the nature of the inflammation. If he be strong, and the disease of an *acute* or sthenic character ; the fibrinous element predominates, tending to adhesions : if of an asthenic ; the serous, leading to the effusion of fluid. The lymph, which is

effused, at first forms a thin film or coating upon the membrane, and if the inflammation involve, to a sufficient degree, the opposing surfaces, adhesions form between the two, assuming various appearances according to the character, extent, and position of the inflammation; for if there be considerable effusion this will gravitate to the lower portions of the pleural cavity, and, by separating the opposing surfaces, prevent adhesion at the part, whilst those that are above the fluid readily adhere. If the disorder be not quickly subdued, it gradually assumes a *chronic* form; the effusion increases, and becomes more serous or sero-purulent in its character. When the disease is of the former description, recovery will frequently take place by the gradual absorption of the effused fluid and of the albuminous exudation, or by the organization of the latter into false membranes, leaving but little impediment to the function of the lungs. If of the latter, and the effusion increases so as to compress the lungs, impede respiration, and gradually to cause a bulging of the thoracic parietes, it should be evacuated by operation, to prevent the fatal results which sooner or later are sure to ensue; and even when this is done,

the patient often succumbs to the general exhaustion and hectic which attends the disease. Sometimes the perforation takes place spontaneously, either through the diaphragm into the peritoneal cavity, or by a fistulous passage through the lungs into the bronchi, or externally through the parietes of the thorax. Cases of this description may last for weeks, months, or even years.

*Symptoms.*—Instances of pleurisy have frequently come under my notice, in which the only symptoms were, pain on taking a deep inspiration, usually referred to the least protected parts of the chest, viz. below the pectoral muscles or mammæ; and with it, considerable tenderness on pressure. This latter is always present in pleurisy, especially in persons of a spare habit of body; but in making it, the pressure should be as much as possible between the ribs; for the pleura, unlike the peritoneum, is partially protected from external pressure by the support and elasticity of these. During the prevalence of cold winds, cases will often occur with only these two symptoms, or with the addition of a short, dry, and painful cough. These may last for several days, if unrelieved, without being accompanied by

any other symptoms except a slightly coated tongue and somewhat quickened pulse. The more severe cases, however, are usually ushered in by rigors, which are soon succeeded by feverish symptoms, such as a hot, dry skin, a white tongue, and thirst, with scanty, high-coloured urine. The respiration becomes short and quick; but there is a constant desire to take a deep inspiration, which the patient is unable to accomplish on account of the acute, stabbing pain which accompanies it. The above are the symptoms of ordinary acute pleurisy. On the other hand, it may be of a sub-acute or asthenic character, and the symptoms so slight, that the disease has been termed *latent* pleurisy. This usually assumes a chronic form, and leads to an effusion of fluid into the pleural sac, which may be either serous, sero-purulent, or mixed with flakes of coagulable lymph. It frequently commences during fever, and the effusion is one of its most troublesome and dangerous sequelæ. This rarely occurs in a vigorous and healthy constitution, especially if early and effective treatment be adopted.

Pleuritic pain is sometimes of a nervous or hysterical character, but the temperament of the patient,

with the absence of pain on pressure in the former, and in addition to these the sex, and an inquiry into the uterine function in the latter, will usually guide us aright.

*Physical Signs.*—In acute pain of the pleura, whether this be of an hysterical or nervous character or the result of inflammation, an effort is made by the individual to diminish the ordinary respiratory movements, and corresponding to this will the normal respiratory murmur be deficient. At the very commencement of pleurisy a rubbing sound is sometimes heard, arising from the friction of the opposing surfaces during the short period when the normal amount of fluid in the pleural sac is diminished. This lasts but a few hours, and is therefore very often never detected, and when the inflammation is in the upper part of the chest, where the movements are slight, this sound, I believe, is but rarely heard, being confined to those parts of the chest where they are greatest. In cases of phthisis, for instance, which, as they reach their more advanced stage, are usually accompanied with more or less pleuritic inflammation, I have never been able to detect this rubbing sound. After a brief



period of dryness of the membrane, effusion begins, and, unless it be speedily arrested, soon causes a series of very unequivocal signs ; these are :

1. *Dulness on percussion* at the lower part of the chest, whilst the middle and upper give their natural resonance ; the cause of this is the effusion gravitating as it is secreted to the part which is lowest, and the lung in a degree floating upon it. This sign, however, is materially modified by a change in the position of the patient, the liquid subsiding during these changes of posture to the lowest part ; it is also liable to be influenced by previous pleuritic adhesions ; as the effusion increases, the liquid mounts up, first to the middle, and afterwards to the upper part of the thorax.

2. *Diminished motion and sound of respiration in the affected side.* These are in proportion to the amount of the effusion.

3. *The alteration in the vocal resonance or ægophony*, as it is termed, from the resemblance of this sound to the bleating of a goat ; it is also somewhat similar to the squeaking of Punchinello ; when this has been once heard, it is too singular a sound ever to be mistaken for any other. My attention was



first directed to it as early as 1838, by the late Dr. Thomas Davies,—who was the first to introduce auscultation into this country,—in a case that occurred at the London Hospital. It is usually most evident, as in this case, near the centre or lower angle of the scapula, and from this to the spinal column, and is best heard in women and children, and in men when the high tones of voice are uttered. It is essentially evanescent in its character, being dependant upon the following conditions: 1. A sufficient amount of serous effusion to moderately compress the lung so as to render it a good conducting medium, and at the same time to narrow the calibre of the bronchial tubes leading to the part; 2. The fluid should be so small in quantity as easily to be thrown into vibrations; 3. A sufficient force of voice to accomplish this. As soon as these conditions alter, the ægophony ceases; for if the layer of fluid be too great it is not easily thrown into vibrations, and the lung is separated from the walls of the chest, the bronchial tubes also are so much compressed as to be unable to transmit the voice. In well defined cases ægophony is easily distinguished from bronchophony, in others it is

not so well marked. If the ægophony should continue for several days it may be considered a favourable sign ; it is at least a proof that the effusion does not increase rapidly.

4. *The interruption of the vocal vibration.* Vibration of the voice is always felt upon applying the hand to the parietes of a healthy thorax ; it is also present in consolidation of the lung, and likewise when there is fluid, if there be adhesions at any part, it being then felt at the site of these ; but where fluid is interposed, it is effectually intercepted.

5. *As the liquid increases all sound of the voice and respiration cease,* except near to the spine under the clavicle and in the axilla, and it is much weaker in these parts than on the sound side.

6. *Enlargement of the affected side.* This is first perceptible at the end of expiration, the side in which the effusion has taken place, and especially its lower part, not diminishing at this period equally with the other. By encircling the chest with a piece of tape, and fixing it at the sternum and spine, it will be observed that the healthy side expands and contracts more readily during respiration, as shown by the tightening and slackening of the tape ; and

as the disease increases the want of symmetry between the two sides becomes very evident, and may be easily determined by measuring them horizontally opposite the ensiform cartilage, and comparing the two, making allowance for the right side being nearly half an inch larger than the left. The intercostal spaces also do not present their usual depression; this sign, however, is not always to be detected in the early stages, but as the disease advances forms one of its most evident signs.

On the sound side, the symptoms are scarcely less important than the above, all the normal actions are increased to compensate for the deficiency on the one that is diseased; the sound of respiration is much increased, approaching in its character to that of children,—in other words, it is *puerile*, and whilst the diseased side is almost fixed, the movements on the healthy one are correspondingly increased. The above symptoms are often greatly modified by previous inflammations, which cause adhesion of the lungs to the walls of the chest, and sometimes to the diaphragm or mediastinum.

If the disease should subside, the symptoms one by one cease, the pain on inspiration and cough-

ing becomes less, the pulse slower, and gradually reaches its normal standard; on the other hand, if the effusion be on the increase, it retains its frequency, but becomes gradually weaker and more thready, the respiration also is quick, although less painful than during the earlier period of the disease. These symptoms, supported by those enumerated above, viz., increased or diminished dulness on percussion, the enlargement or diminution of the side affected, will generally guide us in our prognosis.

Under the following conditions *air* sometimes, though very rarely, collects in the pleural cavity as a result of the effusion; as this becomes absorbed the lung which was compressed by the fluid is retained in that position by the thickened pleura and rigid false membrane covering it, and is therefore unable to expand or the walls of the chest to contract sufficiently to bring the two surfaces in contact—hence air is secreted to fill up the vacuum; the presence of this is usually rendered very evident by the loud sound on percussion, and the absence of the respiratory murmur.

*Treatment.*—I have myself suffered more than once from attacks of incipient pleurisy, caused by

exposure to cold winds in the autumn of the year, after the warm weather and rain winds from the south-west had passed by, and on each of these occasions I have been able effectually to arrest the disorder by exposing the part quite uncovered to the heat of a fire, sufficiently long and intense to produce considerable rubefacient effect. The remedy is valuable because it is easily applied, and is at the same time a most efficient counter-irritant; or hot water fomentations, a bag of hot sand, a bran poultice, or one of linseed meal sprinkled with mustard, a mustard poultice, or even a blister if preferred, may be used. These simple remedies alone, or followed by a purgative, will very frequently remove the disorder if applied at its earliest stage; if, however, the disease should have advanced beyond this and the suffering be more acute, the application of one or two dozen leeches will be necessary and often give immediate relief. But if the malady should be more severe and have been preceded by rigors, and the patient be of a robust plethoric habit, a copious bleeding from the arm to incipient syncope is the most efficient remedy, and often at once relieves the distressing pain on inspiration. This, as in the

other cases, should be followed up by an active aperient and the local application of leeches if the pain continue, and as soon as the febrile excitement shall have subsided a blister of considerable size should be laid over the part; after the bowels have been copiously acted upon, calomel and opium, grains four and one, should be given every six hours until the gums become tender, and a saline with small doses of antimony to promote perspiration. This will give the best chance of the effused fluid and other products of inflammation being absorbed and the parts restored to a healthy condition. After twenty years of practice in a healthy town and rural neighbourhood, only one case has come under my notice of serious after-results from pleurisy; this may reasonably be attributed to the improved knowledge, and therefore treatment, which physical examination has given to chest diseases, and the more prompt and efficient attendance which all classes receive in the present day, as well as the better condition generally of the working population. After the gums have been made tender, the mercury should be omitted for a few days, and it generally happens that it will not be necessary to resort to its use

again, the pain and difficulty of breathing gradually subsiding. If, however, they should continue, although of a subdued character, a mild mercurial may be given at bed time, such as grs. ij or iij of the hyd. c. creta, or the same quantity of the pilula hydrargyri, or (which I very much prefer as the more manageable and efficacious, and in no way more injurious to the constitution) small doses of the hyd. bichloridum, either alone or combined with some tonic, as the tincture of cinchona. When the effusion is small in quantity and the constitution good, we may expect a speedy restoration to health; but if the effusion be more considerable, it will often be months or even longer before it is absorbed. Under these circumstances, the repeated application of blisters or other counter-irritants, such as tartar emetic ointment, or croton oil embrocation, will be necessary. At the same time, the strength should be supported by a light nutritious diet, and, if requisite, the moderate use of stimulants, as wine, bitter ale, etc. If, however, the effusion should appear to increase, and with it the constitutional weakness, the effused fluid should be evacuated, to prevent, if possible, the serious results which are sure to arise if the opera-



tion be delayed ; such as caries of the bones forming the walls of the thorax, fistulous abscesses, which either point externally or penetrate the lungs or abdomen, causing a general prostration of the vital powers, and ultimately leading to tubercular disease. *Paracentesis Thoracis*, however, is not an operation the results of which justify a very favourable prognosis.

If it be resolved to evacuate the effused fluid, the following rules should be attended to. 1. When there is evident pointing, as in a common abscess, the trocar or lancet should be introduced at that part. 2. The skin should be drawn aside so that, when the operation is concluded, the puncture through the skin may not correspond with that through the intercostal muscles and pleura, and thus air is prevented from entering the thorax. 3. The puncture should be made at the upper edge of the ribs to avoid wounding the intercostal artery, which is quite at the lower edge and sometimes below it. 4. The point usually to be chosen is between the fifth and sixth ribs, a little behind their middle, but any point between the third and seventh, if there be either fluctuation or undue prominence, may be



selected. 5. The trocar should not be thrust in further than is sufficient to clear the costal pleura. 6. The patient should be placed on the back, with the head and shoulders slightly raised and inclining to the affected side, and steady pressure should be applied to depress the shoulder, compress the ribs, and push up the diaphragm, and should coughing take place during the operation the finger should be placed over the orifice of the cannula to prevent air being drawn into the pleural cavity, and if the fluid cease to escape, a probe should be introduced to clear the tube of fibrinous shreds or clots of blood; when the fluid has ceased to flow, the integuments should be brought back to their former position, a compress applied and retained in its place with strips of plaster and a bandage. In this way the introduction of air may be effectually prevented, upon the exclusion of which the success of the operation so much depends. It has been recommended to perform the operation under water, the means, however, are not always at hand to accomplish this. The success of the operation appears also to depend much upon the nature of the fluid; if it be purulent, it generally indicates a state of the

parts and of the vital powers that are unfavourable to a restoration of health, and the operation may be required to be repeated several times ; if, on the other hand, it be of a serous character, the evacuation often gives immediate relief, and is succeeded by a speedy recovery.

## PART III.

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### EPIDEMIC DISEASES.

THERE is no department of medicine to which the application of meteorological science is of greater importance than this, and it is believed it will tend completely to remove the vague theories with respect to their origin, and guided by continued and cultivated observations and inquiries, will lead to correct conclusions both as to their nature and treatment. They are so termed from the presumption that they arise from the existence of some specific, general, and superadded cause in the atmosphere; I shall, however, endeavour to show that the views hitherto entertained on this subject are altogether unsupported by observation.

## INFLUENZA.

The various Theories with respect to its Origin.—Its Nature.—Symptoms.—Causes, general and local.—Treatment.—Is Influenza infectious?—Conclusion.—On the relation which Cholera and Gastro-intestinal diseases bear to Influenza.—On Meteorological and Sanitary science generally.

WHEN it is recollected that of all the epidemics this is the most sudden in its appearance, as well as extensive and wide spread, and likewise in many localities the most fatal, the subject is invested with peculiar interest and importance, and as my investigations with respect to its origin have led me to entertain opinions opposed to those of others, but which have only been arrived at after long and careful enquiry; and as even now, in the minds of many, they may require more absolute proof, I must ask in the interval for an indulgent consideration, feeling well assured, however, that as our time and observations are extended they will assuredly be accepted.

As evidence of the unsettled views of the profession on this subject, I will extract a few from the many opinions that have from time to time been advanced, and some from the most recent writers. Thus the influenza of 1633, during which it is said that sixty thousand persons were attacked in the Venetian States, was considered by Paulini to be caused by a *dense fog*, which came from the Adriatic Sea. Now a fog being nothing more than condensed aqueous vapour, would of itself produce an effect directly contrary, viz., a soothing influence upon the lungs and air passages; nor is there anything blended with a sea fog\* that could produce such effects. That which prevailed in 1729-30 was attributed by Lœu to thick sulphurous fogs, this sulphurous transpiration being occasioned by the non-occurrence of an eruption from Vesuvius. Now it is quite impossible that sulphur in any form could exist in the atmosphere without easy detection, by

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\* A sea-fog, like any other, is distressing to asthmatics because the particles of condensed aqueous vapour, being conveyed with the atmosphere into the lungs, impinge upon the air-sacs, and still further interrupt the already imperfect aeration of the blood.

its effects on plants, metals, etc., as well as by appropriate tests. Chemical science might not have been sufficiently advanced in 1730, but at the present time, when influenza is one and the same disease as in former periods, it would, if it existed at all, be easily discovered. Those from 1732 to 1737 were remarkable electric and telluric phenomena, and were said by Huxham to have ceased suddenly after the explosion of a meteor in the air. Dr. Prout attributed this disease to some combination of selenium, and Weber to a negatively electrical state of the atmosphere; whilst Dr. Peacock, in his admirable exposition of this disease as it occurred in 1847-8, considered it to be due to a poison of a telluric or atmospheric character. And since the discovery of "ozone" in the atmosphere (which, however, I maintain to be chlorine), and the effects of this principle upon the respiratory organs when artificially prepared and in a more concentrated state, it has been attributed to it. A long residence on the coast, however, where this is most abundant, has given me the best opportunity of observing its effects, and I can safely affirm that there is no relation between this principle and influenza, the quan-

tity being too minute to produce any or but the slightest influence upon the respiratory organs. It is quite true that in winter ozone is sometimes abundant when catarrh is prevalent, and, combined with other causes, may have some influence; but in summer, when the wind is off the sea, ozone is equally prevalent and there is no influenza; we must, therefore, attribute this disease to other causes than the ozone. These are only a few of the many theories with respect to the causes of this disease. Finally, atmospheric vicissitudes have been considered to have more or less influence in producing it, but neither by ancient nor modern writers have these been accepted as the true and only exciting cause. I shall, however, endeavour to prove that this, like other diseases of the respiratory passages, owes its origin to these, and these alone, the fluctuations on such occasions having been unusually great both in temperature and moisture; the seeds of the disease are, as it were, sown by the destructive influence of a cold dry wind upon the epithelial lining of the air passages, and with this an arrest of secretion, and so long as it lasts the effects may be limited in degree; but when a sudden change takes

place both in temperature and humidity, as in a rapid thaw, the reaction is excessive, and inflammation of the respiratory passages the result. The evidence, however, will be more conclusive if we first describe the nature and symptoms of this disease.

1. *Its Nature.*—Influenza may be defined to be a diffused inflammation of the respiratory passages, commencing in the nasal membrane, at the parts most exposed to the influence of the atmosphere, and rapidly extending to the frontal sinuses and conjunctiva on the one hand, and to the upper part of the pharynx, larynx, trachea, and bronchial tubes on the other, and in more severe cases to the air-sacs themselves, and assuming a type corresponding with the previous condition of the patient. I have myself witnessed influenza both in town and country; in London in 1836-7, and at Worthing in 1847-8. In persons with vigorous constitutions, who were accustomed to live for the greater part of the twenty-four hours in the suburbs of London, and who had around them everything conducive to health, the disease differed in no respect from that which in a few cases showed itself at Worthing in



1847-8, which were very mild, and similar to those which take place more or less every year during the winter months, intensified in one more than another according to the severity of the cause of its production; on the other hand, those who resided altogether in the murky atmosphere of London, and especially where the sanitary arrangements were defective, with other conditions unfavourable to health, which is usually the case amongst the poor, the disease assumed an asthenic type and was more diffuse; for, like erysipelas, the tendency to extension was just in proportion to the lowered vital standard of the patient, and with the extension was the mortality severe.

2. *Symptoms*.—In all epidemics of this disorder the uniformity of symptoms has been most remarkable, and these have been described with the greatest accuracy by numerous trustworthy observers. I may mention Dr. Theophilus Thompson,\* Dr. Peacock,† Dr. Shapter,‡ etc. The disease commences like

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\* The Library of Medicine, vol. iii.

† On the Influenza or Epidemic Catarrhal Fever of 1847-8.

‡ Transactions of the Provincial Medical and Surgical Association, vol. vi.

ordinary coryza, with dryness of the nostrils, which is quickly succeeded by copious defluxion; and as it extends to the frontal sinuses, it causes pain in the forehead; to the conjunctiva, it produces lacrymation; and in passing downwards to the pharynx, larynx, and bronchial tubes, a soreness of the throat, with a hard, dry, husky cough, succeeded by more or less copious expectoration. There is also pain in the chest referrible to the lower part of the sternum, a general lassitude and depression, with pain in the back, and a pulse somewhat accelerated and feeble. This disease presents every variety in degree, from that of simple coryza to where it involves extensively the capillary bronchial tubes and the air-sacs themselves, and in proportion to its extent are the symptoms severe and continued. These, together with the stethoscopic signs, have been already described under the heads of coryza, bronchitis, and pneumonia, of which diseases this appears to be in violent cases a combination. It is unnecessary therefore to re-enumerate them here, for my object is not to extend and enlarge the subject, but rather to abridge it as much as possible consistent with its full elucidation. It will be as

well, however, to refer to two or three symptoms which are supposed to be peculiar, and to give to it a specific character: these are,—The great prostration of the vital powers;—The dyspnœa;—and the frontal headache.

1. *The great prostration of the vital powers.* In coryza, or common cold, there is always great lassitude, pain in the back, a disinclination for exertion, and, in proportion to the severity of the disease, a general vital prostration. In influenza the symptoms are precisely the same, differing only in degree; but in severe cases, as the disease approaches the second stage, we have another cause for this symptom, in the dyspnœa; shewing that an organ essential to life is implicated, and the process of respiration imperfectly performed, and the blood therefore loaded with effete and carbonaceous materials, and the depressing effects of carbonic acid upon the system are well known. A parallel also to this is seen in the effects of a suppressed secretion of bile, and of the excretion of urine, in the rapid prostration of the vital powers; in an ordinary attack of peritonitis or enteritis likewise, in which the vital prostration is equal, or perhaps greater;

in concussion of the brain also, the shock to the system is sometimes so great as to destroy life altogether; and in a case that I have recently witnessed of that very rare disease, idiopathic inflammation of the stomach, excessive vital prostration accompanied with acute spasmodic pain, were the prominent symptoms; yet on a *post mortem* examination no other pathological change was detected, except vascular turgescence with slight thickening of the mucous membrane throughout the entire viscus. The real cause in all these cases is the extent and severity of mischief in organs essential to life, impeding their functions; and in influenza the greater part of the respiratory apparatus is generally affected; and in proportion as this takes place, is the prostration extreme; but in milder cases, where the disease is of the ordinary character, and a vital organ can scarcely be said to be implicated, so great is the extent of surface involved, as indicated by the copious defluxion, as to afford sufficient cause for this symptom; for by a good authority it is considered that the Schneiderian membrane alone covers at least one fourth of the entire respiratory surface; and if we include in our

estimate the membrane lining the frontal sinuses, the antrum maxillare, the sphenoid and ethmoid cells, the turbinated bones, the several meatuses, etc., it cannot be considered as exaggerated. For this also we have a parallel in the case of burns and scalds, and in the latter no deep-seated structures are involved; yet it is estimated that where one third of the body is injured, so great is the shock to the system that death is the inevitable result. Again, let us also associate with this symptom the class of persons in whom it is most evident, viz., the inhabitants of large towns, especially the poor, and those who live in direct violation of every well-known sanitary law; and we have, I maintain, in these combined circumstances more than sufficient to account for it, without assigning as a cause anything *superadded* to the atmosphere of a specific or poisonous nature; and, moreover, when we have disassociated from our minds the specific character of the disease, we at once lose the necessity of assigning to it a specific cause.

In bronchitis likewise, and pneumonia, when these are either sufficiently extensive or severe, to render respiration imperfect or laborious, the vital

depression is usually quite equal to that of influenza. It is quite true, that in influenza of the adynamic type, the reactive fever is not so great as in sporadic cases of bronchitis or pneumonia; but when these latter occur under the same conditions as those which give a fatal effect to the former, the vital prostration is equally great, and their tendency the same to assume an adynamic type. To repeat, then, coryza is influenza of a mild character, occurring in ordinary seasons, and arising from ordinary causes; influenza is coryza associated with inflammation of the fauces, pharynx, larynx, trachea, and upper bronchi, and, in more severe cases, of their minute ramifications; and if there be a further extension of it to the air-sacs, we say it is complicated with pneumonia.

2. *The Dyspnœa*.—This, in severe cases, is a very prominent symptom, the respirations amounting sometimes to thirty or even forty in the minute, and is the best evidence of the extent to which the bronchial tubes and air-sacs are implicated; for the disease usually invades the tubes of both lungs coe-taneously, differing in this respect from ordinary bronchitis, which is generally limited to one, or a

part of one, lung ; and if there be anything special with respect to it, it is the extent of the inflamed surface rather than its local severity ; thus furnishing the best evidence of the universality of the cause, and an explanation of the intensity of this particular symptom.

3. *The frontal Headache.*—This is usually present in common coryza, and is dependent solely on an extension of the inflammation of the Schneiderian membrane to the frontal sinuses. In influenza this symptom is severe only in proportion to the violence of the malady ; and when there is any super-added cerebral disorder, we may reasonably attribute it to the close proximity of these sinuses, and the nasal membrane generally, to the brain and its membranes, and likewise to the great nerves, in their transit from it to the adjacent structures.

*Causes.*—I approach this subject with some diffidence, because the opinions that will be advanced are not only opposed to those of the wisest and best of our profession, but, so far as I have been able to discover, of every medical man who has written on the subject. At the same time I do so with great confidence because I believe there is no one in the

kingdom who has had the same opportunities, and cultivated them with more assiduity ; for it is necessary that a person should reside in a small and healthy town or country district, in order that the atmosphere may be unmixed with extraneous materials, such as smoke, dust, irritating gases, etc. It is also desirable that he should reside on the south coast, where the line of shore is nearly straight ; so that the difference between the effects of a dry land or north wind, and a moist sea or southerly wind, may be clearly defined. A close inquiry into the *origin* of disease is moreover necessary, and there is no better guide to this than the effects of the various atmospheric changes upon our own person, especially if the respiratory surfaces are readily affected ; and when these observations are supported by noticing its influence upon others, they furnish absolute proof. The causes of this disease may be divided into the general or exciting, and the local.

1. *The general or exciting cause.* It would be easy to fill a volume with cases of coryza and ordinary catarrh, which upon close inquiry into the period of their origin could be clearly traced to sud-



den atmospheric changes, or the irritating effects of a north-east wind upon the lining membrane of the nostrils, or the reaction produced by a change from this to a south-west one; but, like every other cause of disease, it may affect a few persons only. Yet these cases differ in no respect, so far as my own observations extend, from those which occur when the disease is more general, except that the cause in the latter being an exaggerated one, the disorder is more severe; and if we admit that in ordinary seasons atmospheric vicissitudes, or an altered condition of the normal constituents of the atmosphere as regards temperature and moisture, are the cause of coryzæ, but little reasoning is required to shew that when these conditions are intensified, as in extraordinary seasons, that the effects will be proportionately more general and severe, producing ordinary influenza. In support of this opinion I would refer to that which occurred at St. Petersburg in 1782, on which occasion “the thermometer, on the 2nd of January, rose during the night from five degrees below, to thirty above zero; and in the morning, in that city alone, 40,000 persons were affected with influenza”; also to that

which prevailed in this country in 1836-7, an account of which is given in the sixth volume of the *Transactions* of the Provincial Medical and Surgical Association (pp. 558-9). "Upon attentively examining the dark line (the weather-line delineated at page 558) there is nothing calling for remark until we arrive at the great depression of temperature between the 22nd and 25th of December, a fall of twenty-five degrees F. in three days. This depression was caused or accompanied by a change of wind from west or north-north-west to north-north-east. On the 25th the wind blew a gale from the latter point, and during the three subsequent days a very unusual quantity of snow fell, unequalled in this country for duration, severity, and extent. A rapid thaw commenced on the 2nd day of January; the influenza appeared in London at the same time, and it was general throughout the country on the 7th, or at farthest on the 10th. The accounts from all parts of the country of the disastrous gales, the drifting of the snow, the floods caused by the thaw, and the outbreak of influenza, rapidly succeeded each other." And as further evidence, a reference may be made to the epidemic of 1847-8, an elabo-

rate account of which has been given by Dr. Peacock in his work on the influenza of that period, from which the following is extracted, p. 107: "The accession of the recent epidemic, it will be remembered, was preceded by an unusually warm autumn, while between the 15th and 19th of November there was a fall of temperature from fifty-four to twenty-seven degrees. On the 20th there was a dense fog, and the temperature again rose to 44.7 on the 21st, and to 49.2 on the 22nd; the disease at the latter date being in full vigour. So far, therefore, as the weather was concerned, there was a considerable similarity between the circumstances attending the two last epidemics."

Yet both Dr. Peacock and the Council of the Provincial Medical and Surgical Association, and, indeed, every author with which I am acquainted, have arrived at the conclusion that mere variations in ordinary atmospheric conditions cannot be the exciting cause of influenza.\* I can only attribute

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\* Whilst writing the above, the following was observed in *The Medical Times and Gazette* of June 10th, 1865, p. 617. It is one out of a multitude of others that might be collected, all accepting the fact, that sudden and extreme changes of weather,

this opinion to the circumstance that no medical man or association of medical men have had or used the opportunity of combining medical science with that of meteorology, and therefore that atmospheric vicissitudes, as the principal exciting cause of pulmonary disease, had been quite overlooked.

2. *The local cause.* When to the general or exciting cause, a local is superadded, such as defective drainage, insufficient food, bad ventilation, deficient sunlight, etc., the result is the terrible mortality of London and our large towns. To illustrate this I extract the following from the valuable report of the Registrar-General on the mortality in one hundred and seventeen districts of England, for the

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and usually cold north-east winds, precede the attack, yet still expressing a belief in the necessity of some superadded cause for its production: "*Epidemic influenza*.—It is worthy of note that during the month of May we have had very sudden and extreme changes of temperature with exceedingly high and cold north-east winds; and that on the day preceding the attack, the little sufferer had invariably been exposed for hours in the open air. Although I am a firm believer in the theory that there exists some *temperies aëris occulta*, to which the disease is owing in the first instance, I cannot in reason abandon the notion of its spreading afterwards by contagion and personal intercourse."

quarter ending December 31st, 1847 (pp. 3 and 4) :  
“The epidemic was much more fatal in some districts of London than in others. To shew this, I take the deaths in each of the London districts during the six weeks from November 21st, 1847, to January 1st, 1848, and comparing them with the population obtain the relative mortality. It was at the rate of 46 per annum to 1,000 living in London. The mortality in the seven years, 1838-44, was at the rate of 25 annually to 1,000 living in London. The mortality was consequently raised, for six weeks, by the epidemic about 80 per cent. above the average. Lewisham, including Blackheath, Sydenham, and Eltham, is one of the healthiest districts in London. The ordinary rate of mortality is 17 annually; during the epidemic it was 27. St. George in the East is one of the unhealthiest districts. The ordinary rate of mortality is 29 in 1,000; the rate of mortality during the epidemic was 73. The increase in Lewisham was 10; in St. George in the East, 44. The latter district suffered *four times* as much from influenza as the former. Excluding districts which contain hospitals or the workhouses of other districts, we have the following result :—

## DEATHS IN 1,000 ANNUALLY.

	Mean annual rate of Mortality, 1838-44.	Annual rate of Mortality during the last six weeks of 1847.	Difference in the Mortality ascribable to the Epidemic.
<i>Least unhealthy Districts of London.</i>			
Six districts of London in which the ordinary mortality of females is lowest . . . . .	20	38	18
<i>Unhealthy Districts of London.</i>			
Six districts of London in which the ordinary mortality of females is highest . . . . .	27	61	34

“The epidemic influenza killed twice as many people in the insalubrious parts of London as it did in those less unhealthy. Its fatality in Lewisham and St. George in the East was, as we have seen, 1 to 4. The annual average rate of mortality for London in 1730-39 was 41 in 1,000; the rate in the six weeks of the epidemic of 1733 was 72 in 1,000; the increase was 31 in 1733; the increase in 1847 was 21.

“Let us look to the few country and small town districts in the present return. The deaths in *St. Albans* (population 17,000 in 1841) during the last quarter of the four years 1844-7, were 94, 75,

91, and 76. The Registrar of the sub-district of St. Albans says, '*no epidemic has visited this district.*' The deaths in the Kendal district (population 35,000) during the last quarters of the four years were 160, 213, 268, and 155 ; in Anglesea (population 38,000) the deaths were 155, 163, 206, 158. The Registrar of Llanddausant, Anglesea, says, 'latently influenza has been prevalent'; but it was, as has been seen, not very fatal. In the Isle of Wight (population 43,000) the deaths in the December quarter of the last four years were 235, 167, 201, 179. The Registrar of the Godshill sub-district says: 'The district would be healthy but for influenza, which has just made its appearance ; but no case has yet been fatal.' Epidemic influenza is mentioned in the notes by the Registrars of Maidstone, Brighton, Portsea Island, Northampton, Cambridge, Norwich,—'*mild, fatal to few.*' Plymouth, very fatal in the St. Andrew's sub-district. Deaths in October, 48 ; November, 49 ; December, 103."

A variety of other reports from *town* districts are also given, but the above will suffice.

"The quarterly return includes a few of the *country* districts ; but it is evident that influenza



pervaded England generally. In many places it appeared later than in London. Some places it has not yet reached at all, or its visitation has been so slight as not to attract attention. The mortality was raised in the unhealthiest towns; but on the whole, much less in mixed town and country districts than in London. The deaths in the December quarters of the four years 1844-7 were, in the districts of London, 13,819, 11,838, 13,221 18,533 (thirteen weeks); in the other districts, 30,261, 27,453, 39,872, and 38,320. In the latter districts, notwithstanding the epidemic influenza, the mortality on the whole was lower in 1847 than in 1846. The weather, as will be seen from Mr. Glaisher's lucid statement, did not differ much in any part of the country."

To the above I will add the town of Worthing and district, which at that time contained a population of between 18,000 and 19,000. The registered deaths from influenza in 1847 were two, and in 1848 two; yet the rate of mortality during the ten years 1841-51, which comprised the epidemic, was only 17 per 1,000; whilst from 1851-61, during which there was no recorded epidemic, it was 18 per 1,000.



These figures include with the town of Worthing those of Littlehampton and Arundel with the surrounding district. In the town itself the mortality was considerably lower than this. It is quite clear, therefore, that whilst the epidemic was raging in London, Plymouth, and other large towns, there was no epidemic in many country districts and small towns, such as Worthing, St. Albans, etc.; or, at least, of so mild a character as to deprive it of all significance.

A close enquiry, therefore, into the nature of this disease leads us to conclude that, with respect to the causes of its severe and terribly fatal results, they are the same as those which intensify the other scourges of mankind, viz., cholera, typhus, typhoid fever, scarlatina, etc. There is this difference, however, that whilst in these latter a morbid local poison is the immediate cause of the disorder, and the general condition of the atmosphere only secondary; the cause of influenza is the atmosphere itself, the local conditions intensifying the general result: in other words, you may have influenza, that is, coryza with an extension of the inflammation to the bronchial tubes, etc., without any

local cause ; and on the other hand, cholera and fever, both typhus and typhoid, as well as scarlatina, may be produced from local conditions only, the state of the atmosphere generally, merely favouring their production. Yet for all these diseases to assume a fatal and likewise epidemic character, the combined causes are necessary,—in the one case the superadded local condition, in the other the general ; but by removing the local, which is entirely within our power, we not only rid ourselves of this source of disease, but render the general influence comparatively harmless.

*Treatment.*—Casting aside the specific character of the disease, we shall at once be led to its appropriate treatment. Looking at the disease in ordinary cases as coryza, with an extension of the inflammation, in some degree, to the larynx, trachea, and primary bronchi ; a mild aperient, an abstemious diet, with diluents and salines, with or without small doses of antimony, and remaining in the house with the air at a moderate and equable temperature, is all the treatment that is necessary ; but if the disease extend to the smaller bronchi or air-sacs, then a more powerful antiphlogistic treatment will be

required, taking into consideration at all times the constitution of the patient, his mode of life, and the favourable or unfavourable sanitary condition in which he may have been placed. If he be strong and robust, and reside in the country, a copious abstraction of blood may be needed, as in ordinary bronchitis and pneumonia; but if in the densely populated districts of a city, where the epidemic assumes a low or adynamic type, it would be most injudicious to lower the strength, and the treatment must consist of aperients and counter-irritants with salines, combined or not with small doses of antimony; and at a very early period the vital powers must be supported by broths, beef tea, and moderate stimulants. The symptoms, however, are so closely allied to those of other inflammatory diseases of the respiratory passages, that a reference may be made for the treatment to what has already been said when treating of these.

*Is influenza infectious?* In this, as in many other diseases, the question of infection has always been a vexed one. It appears to me, however, that it might be easily set at rest by considering it simply as one of degree. The malaria of uncultivated dis-

tricts, for instance, will produce intermittent fever ; but the influence extends for a short distance only, its dilution with a purer air entirely counteracting its effects ; and the cholera and jungle fever of the plains of India are quite unknown in the hill districts scarcely a mile removed in altitude. The same may be said of the poison of typhus, typhoid fever, and a variety of other infectious diseases ; some, as small-pox and scarlet fever, being infectious in a very high degree ; and others, as cholera, influenza, and hooping-cough, in a very low one. When highly concentrated, I believe the emanations from the bodies of persons suffering both from influenza and cholera to be infectious. It is only in this way that we can account for the devastating influence of these diseases. Under ordinary circumstances, however, there is no positive evidence that either the one or the other is so.

*Conclusion.*—The subject of the *causes* of influenza, which is the most wide spread, and perhaps the most fatal of all the epidemics, is of too great importance to the welfare of mankind to be passed over without a re-enumeration of the facts and arguments in proof of my proposition ; it is in-

tended, therefore, briefly to review them, for it is believed they will not only lead irresistibly to the conclusions previously mentioned as to the causes ; but also to the highest practical good in reference to its prevention ; by forming another link in the chain of the already too forcible evidence of the necessity of increased attention to the sanitary condition of the people, especially amongst the inhabitants of large towns.

When treating of the subject of coryza, I endeavoured to prove that the local contact of the atmosphere upon the Schneiderian membrane was the essential cause of the disease ; the fact is so evident, that it is a matter of surprise that it should have been generally overlooked, and I feel assured that it is only necessary to direct attention to it to be at once accepted, but if not, it may be easily verified by observation ; it should also be recollected that our north-east winds are not only the driest, but in winter the coldest, and therefore when these winds prevail there is an increased necessity for the warmth of our houses, so that the fluctuations to which we are exposed are very imperfectly represented by the records of temperature of the external

atmosphere ; our apartments are heated to a temperature of sixty, sixty-five, or sometimes even seventy degrees Fahrenheit—to say nothing of the direct rays of heat from an open fire, to which we habitually expose ourselves—whilst the external air may be at thirty, twenty, or even lower, representing at its extremes a fluctuation of fifty degrees, and the houses of the poor are frequently heated with stoves or coke fires, and present, in every other respect, conditions favourable to the production of an irritating and impure atmosphere ; in these circumstances, therefore, we have, I maintain, every requisite condition for the production of this disease.

It may be asked, why do coryza, bronchitis, and pneumonia prevail in one year and influenza in another ? my reply is ; they are all diseases of the respiratory mucous surface, and, as I have said elsewhere, coryza almost invariably precedes bronchitis, unless there has been pre-existing disease in a chronic form, and bronchitis invariably precedes pneumonia ; and influenza differs from these in this respect ; the cause is an exaggerated one, the effects therefore are exaggerated ; in other

words, influenza is a severe form of coryza, usually extending to the larynx, trachea, and primary bronchi, and in fatal cases to their capillary ramifications and the pulmonary air sacs; our *post mortem* examinations have revealed all this a long time ago, nor can we disconnect, altogether, either of these disorders. Primary bronchitis and pneumonia are usually preceded by inflammation of those portions of the respiratory passages more immediately exposed to the influence of the atmosphere, and influenza is never fatal unless complicated with bronchitis or pneumonia; they are all diseases of the respiratory apparatus, the constitutional effects being modified, and corresponding with the anatomical characters of the parts chiefly affected; hence in ordinary seasons we have coryza with bronchitis or pneumonia, and the ordinary fatal results of these diseases; in extraordinary ones we have influenza, that is, a more severe form of coryza, and a correspondingly severe degree of bronchitis or pneumonia, producing in our towns and unhealthy localities rapidly fatal results, the number of these being so increased as to assume the characters of an epidemic.



ON THE RELATION WHICH CHOLERA AND GASTRO-  
INTESTINAL DISEASES BEAR TO INFLUENZA.

A careful consideration of the relation which cholera and gastro-intestinal diseases generally bear to the disorder, will, I believe, tend still further to remove any doubts that may yet remain as to its causes, and clear up, in a great degree, the mysterious origin of cholera also. Thus Dr. Hancock observes, in his article on influenza, in his *Cyclopædia of Practical Medicine*: "It is scarcely possible to look over the histories of influenza without perceiving a connexion between this disease and morbid affections of the mucous membrane of the stomach and intestines;" and Dr. Fothergill, Dr. Heberden, and other writers, describe the epidemic of 1775, as often attended with diarrhœa, especially towards its close. Dr. Peacock\* also writes, "The epidemic of 1762,† which broke out in April, and to which succeeded the appearance of dysentery, in July, was itself, in some instances and in some localities complicated with bilious and dysenteric

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\* On the Influenza of 1847-8, pp. 101-2.

† Baker De Catarrho et Dysenteria Londinensi 1762.



affections, and with fever of a remittent character. The Catarrhal fever, which ravaged Scotland in 1758,\* on the other hand, followed a great prevalence of diarrhoea and dysentery, and was at times attended with bilious vomiting, diarrhoea, and hæmorrhage from the mucous membrane. Similar evidence of the almost constant connexion of influenza with abdominal affections, and of the prevalence of such affections before, during, or after visitations of that disease, will be found in reference to the epidemics of 1742, 1737, 1733, and 1729, and indeed of all those recorded to have visited Europe. In several of the very early accounts, the epidemic is stated to have preceded or followed the raging of malignant fevers; and it is highly interesting, and not beside our purpose, to remark the coincidence between the influenza of May, 1831, and the outbreak of epidemic cholera in the north of England in the following November, and in London in the succeeding June; as also of the reappearance of influenza in April, 1833, and of cholera in the subsequent July, and the connexion which existed between the two

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\* R. Whyte, *Med. Obs. and Enq.*, vol. ii, 1764, p. 187.

diseases in other countries.” It will thus be seen that there is a close relation between cholera and other abdominal diseases and influenza, and I venture to give the following explanation.

*The Causes of Cholera*, like those of influenza, are of two kinds, viz, the *General*, or *Exciting*, and the *Local*, whilst to both may be added the *Predisposing*, that is, a state of constitutional debility which is engendered by all those influences which are known to favour this, and lead to the production of a variety of other diseases to which the human system is liable ; but it is with the two former that we have chiefly to do on the present occasion.

1. *The General, or Exciting Cause*.—These appear to be in many respects almost the exact counterpart of each other ; for instance, cholera, in its main force, is usually associated with an elevated temperature, or rather it occurs at those periods of the year when the effects of an elevated temperature on the system are most observed, viz., in the months of July, August, and September, whilst a stagnant, humid atmosphere, and places of low elevation, are most favourable to its production ;\* on the other

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\* Registrar-General's Report on the Cholera in England, 1848-9.

hand, influenza is generally produced by a diminished temperature, and occurs in localities most exposed to the influence of the winds, which are usually of considerable strength, and although the apparent outbreak of the disease may be, as in 1837, at the immediate change from these conditions to one of an opposite character, that is, of increased warmth and moisture, or what is commonly termed the "breaking up of the frost;" still, in these cases, I have constantly noticed that the disease has taken its origin as a coryza at the period when the air was cold and dry, its extension and increase being favoured by the change. I am by no means prepared to assert that a cold dry atmosphere is essential to the production of this disease, but only that, of all the atmospheric conditions, it is the most potent. Every medical man is aware that inflammatory diseases of the lungs will occasionally take place even in midsummer, but it is equally true that they vastly preponderate in the winter, spring, and autumn. Dr. Thompson, in his essay on influenza in the *Library of Medicine*, has stated that out of fifty epidemics, twenty-two occurred in winter, twelve in spring, and eleven in the autumn,

whilst only five took place in summer ; and this is about what we might have expected, assigning as the sole exciting cause atmospheric fluctuations ; for, allowing the preponderance to be vastly greater in winter, from the low temperature, the autumn, with its north-west winds and stormy weather succeeding to the heat of summer, would be sure, in many instances, to light up lung disease ; and the cold dry winds of March, followed by the rapid alternations of temperature which take place during the showery weather of April, significantly called “black thorn winter,” is equally with that of autumn productive of the same results ; whilst even in the summer the changes from the mid-day heat to the evening cold are sufficiently great to occasionally excite inflammation of the respiratory apparatus. Moreover, if this disease arose from any general and superadded cause, we might reasonably expect, that through a series of years, it would occur at one season equally with the other, or, if there should be any preponderance, it would be for the most part in summer, when the disturbing influence of heat was in operation, rather than in winter, which is found to be the case.

The statement made, and so often repeated, that *cholera and influenza travel with regularity from east to west*, upon close investigation is too full of discrepancies to be accepted as correct ; still the well-known absence of nearly all sanitary laws amongst the vast populations of the east, and in the towns and cities of the Mediterranean coasts, and Europe generally, and the great preponderance of atmospheric fluctuations in the interior of large continents, and therefore of those conditions known to be favourable to the production of epidemic diseases, gives considerable weight to the opinion of their commencement in these countries ; but on the other hand, the time attributed to their transit is so completely opposed to all we know of the rate at which the atmosphere usually travels, and also to the fact that, notwithstanding the universality of the cause, whole districts of the open country are left, in both these diseases, entirely unscathed, attacking only the towns, that it is impossible to consider either of them as the result of anything of a specific or poisonous nature in the atmosphere. I would, moreover, ask, Why set aside a well-ascertained and sufficient cause of these dis-

orders, viz., atmospheric fluctuations, for one that is altogether hypothetical? We have no proof, and it is entirely opposed to all analogy, that there should be superadded to the atmosphere any morbid influence, strictly so called, of such a general and widespread character as the ravages of these diseases. Moreover, in these days of scientific research, when chemistry has reached so high a standard of perfection, that very much less than the ten-thousandth of a grain of a principle can be detected both in liquids and in the atmosphere,—that poisons so universally diffused, and capable of producing such severe results, should exist without the smallest evidence of their presence, is alike opposed to meteorological science and sound inductive philosophy. I am well aware that chemical science has never detected the poison of plague, typhus, typhoid fever, small-pox, scarlatina, etc.; but in all these instances the disease can be traced either to infection or local causes, yet until recently each was considered of a pestilential or general character.

As time, therefore, advances, and meteorological and sanitary science become developed, we shall discover in these, as in all the higher pursuits, a

grand simplicity, and that our bountiful Father has not inflicted upon us these terrible visitations; but rather that we, from a disobedience of his laws (from ignorance it may have been), have brought them on ourselves; and, moreover, that the atmospheric conditions under which they are developed are essential to our well-being.

2. *The local Causes.*—In both disorders these appear to be identical, the principal of which are the following:

I. *Bad drainage*, from which the atmosphere becomes contaminated with the emanations of decomposing animal and vegetable matter, the poison being received into the system through the medium of the lungs.

II. *Impure water*, by which the same principles infect the system through the stomach.

III. *Improper or insufficient food*, by which the same result is produced, or the body imperfectly nourished.

IV. *Insufficient ventilation*, from which the quantity of oxygen becomes deficient, and the atmosphere loaded with carbonic acid gas, etc.

V. *Over-crowding*, causing the same results.

VI. *Deficient sunlight*.



All these conditions, which prevail in large towns and unhealthy districts, cause both classes of disease to assume an asthenic form, converting ordinary diarrhoea into cholera, and ordinary influenza into the more fatal kind ; and when once produced, partly from their infectious nature, however limited this may be in degree, but chiefly from the disposition of all diseases in such localities to assume a low or adynamic type, engender in the one instance epidemic cholera, in the other epidemic influenza.

Taking, therefore, as our standard the healthy rural districts, and some of the watering-places of England as a type of what our sanitary condition should be ; and observing that these places are almost uninfluenced by the causes which produce not only cholera, fever, etc., but likewise influenza, we may reasonably hope that the time will arrive when such diseases in their asthenic and fatal form will, in this country at least, be almost unknown ; and that as the nation, by her enlightened legislation, has given to the poor cheap and abundant food, and by her unrestricted commercial intercourse with the rest of the world has set a pattern to mankind which is being rapidly imitated, so it is believed, that as



scientific truths, bearing upon sanitary science, become revealed, and the latter receives its full development, that not only shall we derive incalculable benefits ourselves, but as these become known, they will be gradually extended throughout the whole of the civilized world.

If, therefore, it should accord with the designs of an all-wise and beneficent Providence to avert from us the scourge of war, and permit a more extended intercourse among the nations of the earth, by which their wisdom may be communicated, and the productions of each region supplied to the others, we may hope at no distant period to see even the poorest supplied with every requisite for healthy existence, and those sanitary laws enjoined by which alone it can be secured ; for notwithstanding all the attention that has been paid to this great question, it may still be said that a large portion of our population, both in town and country, are herded together, deprived of pure air and sunlight, with defective drainage, and in many cases insufficient food ; exhibiting, as an undeniable fact, a condition infinitely worse than that which is accorded to animals maintained either for our gain or pleasure. Nor

can I help associating with such visitations the finger of God directing us in a course of duty to our fellow creatures, who may reasonably be considered as the objects of his especial care. It is to our interest, therefore, to cultivate with all possible diligence the abstract sciences, by which alone these laws can be demonstrated ; and when once they are clearly understood, to lose no time in giving them practical effect, being well assured that any violation of them will most certainly be visited with condign punishment; and on the other hand, if effectually carried out, that a rich reward will crown our efforts in a happy, contented, and loyal people.

I will now make a few observations *on meteorological and sanitary science generally*, which although in a measure foreign to the object I have had in view, still, as I have shewn that they have an immediate bearing upon the cause and prevention of influenza, they can hardly be considered misplaced.

Before we can obtain that amount of accurate information which is required to bring conviction home to the minds of the profession generally, so as to lead to the practical application of rules, it is necessary

1st. That observations should be taken of the *origin* of all diseases produced directly or indirectly by atmospheric causes.

2ndly. That daily records should be made of the *fluctuations* in temperature and humidity, of the barometer, etc.; daily, monthly, quarterly, and yearly *averages* are not sufficient. For instance, the high day-temperature such as occurs in London and inland towns during a week or month may have been productive of diarrhoea, and in some seasons, of cholera; yet the low night-temperature would compensate for this, and the average give a very insufficient data, approximating to the coast, whilst the daily fluctuations may be twenty degrees less at the latter, the low day-temperature being compensated by the small reduction at night; and as far as my observations extend, both lung and abdominal diseases are far less common on the coast than in the interior.

For this purpose, therefore, a corps of about a dozen medical men should be placed in localities differing as much as possible from each other, viz., one on the south coast, one on the east, another on the west, and another on the north; two in London; one at

Manchester, one in Liverpool, another at Bedford, and the remainder in healthy country districts in the interior, and their observations published and circulated by the daily journals, so as to come as quickly as possible under the notice of the profession. Medical men would then have an opportunity, for the first time, of associating, on an extended scale, cause and effect; and the result would be, I am satisfied, a complete verification of the statements and opinions embodied in this work. The field is a new one—the ground unbroken; but properly cultivated, would not only set the question of the causation of influenza and other epidemic diseases completely at rest, but would supply another link in the chain of the already forcible evidence of the necessity of improved sanitary regulations.

Sanitary science has already done much in tracing out the *local* causes of disease, but little has hitherto been accomplished towards the discovery of those *general atmospheric conditions* by which these local influences are brought into operation; and we have, therefore, been compelled to found our opinions upon the most imaginary and delusive foundations. It is true that for some years meteorological

records have been made throughout the kingdom, and published in the quarterly Reports of the Registrar-General ; but the majority of the observers are not medical men, eleven only out of forty-three ; and even amongst these I am not aware that any well-defined object has been kept in view, or arrangement adopted.

It would be neither possible, nor desirable, that great questions like these should be worked out by an individual ; but a dozen or score of accurate observers, both of atmospheric changes and the commencement of disease, and these supported by the bulk of the profession, would soon bring about a solution of all the great problems connected with the origin of epidemic diseases, and sanitary science generally ; for as time advances, and our records are extended, it is not to be expected but that some modification of the views embodied on this subject may be made, yet I am persuaded that *substantially* they will be found correct.

## PERTUSSIS, OR HOOPING-COUGH.

Its Pathology.—Symptoms.—Causes.—On the cause of Zymotic and Infectious diseases generally.—Treatment.

ON this disease I shall be very brief, because many of the observations that have been made in reference to influenza will equally apply to pertussis, and my work has already extended far beyond the limits originally intended.

*Pathology.*—Pertussis may be defined to be an inflammation of the respiratory passages, commencing as a coryza, and gradually extending to the larynx, trachea, and bronchial tubes, and in severe cases to the air-sacs ; but the characteristic features are, its being a disease of infancy, its attacking a person, usually, only once in their lives, and in the circular fibres of the bronchi being apparently more than ordinarily affected. This latter, however, may in my opinion be attributed rather to the peculiar susceptibility of the nervous, and irritability of the muscular system, at this period of life, than to any special lesion of these structures.

*Symptoms.*—The first symptoms are those of an ordinary cold, viz., sneezing with defluxion, pain in the forehead, and more or less febrile disturbance according to the severity of the disorder ; the febrile symptoms, however, are not usually severe ; as the disease extends downwards, there is soreness of the chest with a hard, ringing cough, which after a few days exhibits the characteristic whoop ; this gradually increases for about a week or ten days, and then as gradually subsides, retaining its peculiar character till the last, which in ordinary cases is in about six or eight weeks. There is, however, a great difference in the severity of this disease, depending chiefly upon the pulmonic complications and the constitution of the patient.

On applying the ear to the chest we discover the ordinary symptoms of a mild bronchitis, viz., sonorous, sibilant, and mucous rhonchi, whilst during the whoop there is the absence of nearly all sound within the thorax, showing that the contraction of the muscular fibres of the larynx, trachea, and bronchi, almost completely interrupt the ingress of air.

*Causes.*—It was a favourite observation of the

late Mr. John Scott, the eminent surgeon to the London Hospital, "that most men had a hobby, and if it were a good one (and if not he would be sure to get rid of it) it was scarcely to be expected but that occasionally he would ride it rather too hard." I fear that, in giving the causes of lung diseases, or rather of diseases of the respiratory passages, and in attributing them all, or the exciting cause of all, to atmospheric vicissitudes, and I include hooping cough amongst the number, it will be said that *I* have a hobby, and have really ridden it rather too hard; yet I trust I shall be able to show that this, in common with all the others, undoubtedly arises from one and the same source, in proof of which I extract the following from Dr. George Gibb's able treatise on the subject, pages 233-4. "It is observed to be much milder in warm than in cold climates, and it is also more frequent in the cold than in the warm months of the year. Climate has much influence on the mortality, but very little upon its presence or extension. In the cold countries of the north, as shown in the chapter devoted to climate, it is not only very prevalent, but very fatal; it is less frequent and much less severe in



the south and near the tropics, as a general rule, although there may be exceptions, as in the fatal epidemic in Madeira in 1808, but the climate of that island is modified from its isolated position in the Atlantic Ocean. It would seem to be in conformity with this law that the disease is found to be more severe in this country during winter and spring (some say it is of longer duration in autumn and winter) than in summer and autumn."

The above accord entirely with my own observations, and are in strict agreement with the opinion already expressed when speaking of influenza, viz., that although these diseases may and do occasionally occur even in mid-summer, and when once lighted up spread by infection, causing what is termed an epidemic, nevertheless that they prevail infinitely more in cold countries than in hot, and in winter, spring, and autumn than in the summer.

I present also the following explanation of *the cause of zymotic and infectious diseases generally*.—A particular state of the atmosphere, such as excessive heat accompanied by rain, succeeding to drought, and then again great heat, producing the two conditions (viz., warmth and moisture) most

favourable to the rapid decomposition of animal and vegetable matter, or what is termed the putrefactive fermentation, during which a large amount of gaseous products of a poisonous nature are rapidly developed, and this associated with a stagnant atmosphere, are the general circumstances under which cholera and diarrhoea, typhus and typhoid fever are usually developed,\* and, when once engendered, have the power of infecting or reproducing the disease in other persons, the original cause being totally different to that by which they are reproduced. On the other hand, influenza and whooping cough, and I would also add measles, are caused by atmospheric conditions almost the exact counterpart, viz., a cold dry wind; this arrests secretion from the respiratory surfaces, and causes

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\* In support of the above, see Registrar-General's Report, Plate 2—a diagram representing the deaths from cholera and diarrhoea on each day of the year in 1849, with the meteorological phenomena registered at Greenwich on the corresponding days.

The atmospheric conditions also under which diarrhoea became very prevalent in many parts of the kingdom, and cholera made its appearance at Southampton last year (1865), and likewise the cattle plague commenced and extended, correspond closely with the above.

inflammation—specific or peculiar in its character it may be—by which an exhalation and secretion are produced capable of reproducing the disease, precisely in the same way as morbid exhalations and secretions from the gastro-intestinal mucous surfaces, when once developed, cause typhus, typhoid fever, and cholera, reproducing, as it were, their kind, the power of reproduction differing materially in one case over that of another. And in disorders likewise of the respiratory apparatus, as in gastro-enteritic diseases, there appears to be no distinct line of demarcation between the infectious and non-infectious; for instance, it is not considered that either sporadic pneumonia, bronchitis, or coryza, are infectious, although the latter by some is thought to be so; influenza is infectious in a very low degree only; pertussis markedly so; whilst measles, the exciting cause of which is undoubtedly the same as that of other lung-diseases, is highly so, the arrest of secretion and excretion producing likewise, in this latter disorder, an exanthematous rash; thus conveying us from diseases of the respiratory mucous surface to a combination of these with the exanthemata, and from the latter to a connexion with dis-

orders of the gastric mucous surface, or to scarlatina, and so on to typhus, typhoid fever, and cholera ; and from these again to dysentery, which, like influenza, is infectious in a very low degree only ; and then to diarrhœa and enteritis, which, like bronchitis and pneumonia, are altogether non-infectious.

I would therefore imply that the cold, dry winds of winter, or great atmospheric fluctuations at these periods, bear the same relation to influenza, hooping-cough, and measles, as heat, moisture, and a stagnant atmosphere do to cholera, typhus, and typhoid fever ; that is, they are the atmospheric conditions by which the local causes are brought into *fatal* effect ; for hooping-cough and measles, like influenza, notwithstanding their infectious nature, are to the robust but rarely fatal or even severe diseases ; but when occurring amongst the inhabitants of crowded towns and cities, with depressed nervous power, are the most severe of epidemics. Whilst, however, as I have before explained, the cold, dry winds of winter are the actual as well as exciting cause of the lung-disorders, their fatal results being mainly owing to local conditions, the

heat and moisture of summer, with a stagnant atmosphere, are not in themselves capable of producing these diseases, but are merely the general conditions by which the local are brought into operation. Nor, as is well known, are the former at all times necessary, for in London and our large cities there are localities permanently so pestiferous, from the absence of all sanitary regulations, as to engender these diseases at any time or season, even the most healthy. The above appears to me to offer the readiest explanation of this most obscure subject, of which, however, much remains to be learned.

*Treatment.*—The remedies for this disease may, indeed, be said to be legion ; and so completely are they at variance in their therapeutical effects, that we may reasonably question the value of any ; yet if we be guided by the well-known pathological character of the disease in its several stages, and the constitution of the patient, we shall have but little difficulty in assigning to each its true value.

In the first stage, which is strictly inflammatory, and limited to the mucous lining of the nares, trachea, and upper bronchi, mild aperients, with salines and small doses of antimony, and counter-irritants

are the remedies ; and in the second stage, when the inflammation has extended to the muscular coat of the bronchi, and there are exalted irritability and contractility, sedatives are required to allay this ; and those may be used which, according to the experience of the practitioner, have been found most successful, such as hemlock and belladonna. I have been accustomed to give alkalies with poppy or henbane, and in more severe cases morphia, which of all the sedatives I consider to be the most manageable and certain in its effects ; and where the patient is old enough to anticipate the fit, the guarded inhalation of chloroform is sometimes useful ; but whatever remedies are used, we must expect that this stage will last from two to four or five weeks. For the last stage, which is essentially one of debility, tonics, and especially a change of air to the south coast, are most useful ; and where there are pulmonary or other complications, they must be dealt with according to the rules laid down in the treatment of these diseases.

Dr. Gibb speaks in the highest terms of nitric acid, which, he states, shortens the disease almost as effectually as quinine does intermittent fever.

## MEASLES.

A FEW words upon measles, and I have done with epidemic diseases of the respiratory passages. All our observations point to a close connexion between these three, measles, hooping-cough, and influenza ; and although measles is not usually classed amongst lung-diseases, still the circumstance of the respiratory organs being invariably affected, and from its generally preceding, accompanying, or succeeding one or the other of the two latter, and also from its prevailing, for the most part, either in the winter or spring, and very rarely in summer or early autumn, lead us to conclude that it has for its origin the same atmospheric conditions which produce the others. And, as I have before stated, bearing in mind that the original cause of epidemic abdominal, and, indeed, of epidemic diseases generally, is widely different to that by which they are reproduced, we have only to apply a similar explanation to this, and associate with it, as an exciting cause, the same



atmospheric conditions that produce the other lung-disorders, and we have a ready explanation of its epidemic character. It is quite true that it is not yet understood why the same cause, viz., atmospheric vicissitudes operating upon the respiratory mucous surfaces, should produce in one case an infectious disease, and in the other a non-infectious one; yet the anomaly is not so great as would at first sight appear. For in abdominal diseases of an inflammatory or febrile type, and usually traceable to the same causes, differing only in degree, one class is infectious, and the other non-infectious. In inflammation of the skin likewise, or erysipelas, one kind is contagious, the other non-contagious; and lastly, in diseases of the conjunctiva, which from its partial exposure may be considered as a structure intermediate to skin on the one hand, and mucous membrane on the other, we have two kinds of inflammation, the ordinary acute and the catarrhal, which so far as we are aware are produced by the same cause, differing only in severity, that is, exposure to cold or any other local irritation; yet the former is considered as in no way infectious, and the latter as both contagious and infectious. We have at present



no absolute interpretation to offer for all this ; the facts, therefore, are merely recorded, and their elucidation left to the same agencies as those by which the other mysteries have been explained, viz., to time, observation, and experiment.

## PART IV.

ON THAT DISEASE WHICH ARISES CHIEFLY FROM  
CONSTITUTIONAL CAUSES, EITHER HEREDITARY  
OR ENGENDERED.

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### PHTHISIS PULMONALIS, OR PULMONARY CONSUMPTION.

Introductory Observations.—Its Pathology.—Causes.—Symptoms.—Treatment.

IF any confidence is to be placed in the statement that in England alone more than fifty thousand\* persons die annually of this disease, or if it be even an approach to the truth, and there is every reason to believe that it is; likewise that in every region of the globe this dire disease afflicts our race; the careful investigation of its causes, by which alone it is possible materially to reduce the number of its

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\* See an introductory report by the medical officer of the General Board of Health on the preventability of certain kinds of premature death (p. xxii, 1858).

victims, or the application of the mind to relieve the suffering which this disease entails, must always be regarded as deserving of the highest consideration.

Before the introduction of the stethoscope, by which we are enabled to define with almost absolute certainty the existence of this disease, phthisis was considered altogether incurable ; and when restoration to health took place from any pulmonary complaint, however positively the general signs might have indicated consumption, the disorder was invariably considered to be some other ; and he who was so bold as to assert that this disease was even within the pale of hope, was considered either a charlatan or a visionist.

We owe to Laennec, the illustrious discoverer of this simple instrument, the exposure of the fallacy of this opinion ; and grounded upon the revelations arising from its use, there is now scarcely a physician of repute who does not admit that this, the most prevalent of all diseases, will in many instances admit of cure ; and that there are none in which life may not be prolonged, and suffering greatly alleviated ; and even in those cases which have reached their most advanced stage, and the chances of resto-

ration are very slight, so much may be done to assuage pain, and render existence comparatively tranquil and happy, as to make the duties of the physician one of the most satisfactory that can fall to the lot of any man.

Nor do I think, avoiding all cant, which I utterly detest, and without any desire to encroach upon the duties of the ministers of religion, that legitimate spiritual consolation from the medical man is in any way misplaced ; for of all the professions that serve to give exalted views of the power, the wisdom, and goodness of God, and to inspire us with the belief that our existence does not end here, but rather, in accordance with the words of Elihu in the Book of Job, “ But there is a spirit in man, and the inspiration of the Almighty giveth them understanding,” that of medicine and the collateral sciences seem the first ; for he who has cultivated his profession with assiduity, and examined the mysterious processes by which our existence is begun and perpetuated, will cease to doubt the power of the Deity either to recreate or continue it, after we have yielded to the earth the perishable materials which compose our frames. With these convictions con-

stantly present in his mind, he is often enabled materially to aid in their generous efforts the physicians of the soul, without any regard to the particular sect to which the sick person may belong, feeling well assured that the good will be accepted by the Father of all.

We shall best arrive at a knowledge of the origin or causes of this disease by a careful consideration, first, of

#### ITS NATURE OR PATHOLOGY.

1. *Its anatomical Characters.\**—Phthisis pulmonalis essentially consists of a solidified albuminous or fibrinous exudate from the blood-vessels, which as it transudes becomes blended with and deposited in the surrounding tissues. It is usually found in the upper lobes of the lungs, in a scattered, aggregated, or stellate form, and presents itself in *two* essentially distinct conditions.

1. *The simple fibrinous tubercle.* This appears to

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\* On this subject I have adopted the nomenclature, and in a degree the language, of Rokitsansky, taken from vol. i. of his *Pathological Anatomy*, translated by William Edward Swaine, M.D., and published by the Sydenham Society in 1854.

the unaided sight as small, semi-transparent granules about the size of millet-seeds, generally of a roundish nodulated form, and feeling hard when pressed between the fingers, constituting the *grey, semi-transparent tubercle* of Laennec. Blended with these we occasionally meet with others which are somewhat smaller, less firm, and more transparent.

II. *The fibrinous, croupous tubercle.* This presents itself in the shape of roundish nodules, which vary in size from that of a millet-seed to hemp-seeds or peas, of a yellow colour, more or less firm, friable, lardaceous, and curd-like. This form is termed *yellow tubercle*.

Under the microscope the *first form* has the appearance of a more or less pellucid fixed blastema, embodying within its substance elementary granules of various size, nuclei, and nucleated cells, the latter very few in number, and from the two thousandth to the four thousandth of an inch in diameter, of an irregular form, being either somewhat round, oval, angular, bulging, or dumb-bell shaped, and containing within them several granules, but without any distinct nucleus.

The *second form* also exhibits the same elements,

viz., a fixed blastema with granules and corpuscles, likewise numerous exceedingly minute molecules.

The tendency of the *first form* is to its extinction, or a gradual wasting of its substance ; it shrivels, and becomes tougher and harder. Occasionally there is blended with it a bony deposition, the tubercle becoming partly cornified and partly ossified. This form of tubercle never softens.

The tendency of the *second form* is to suppuration or *softening*, and also to *cretefaction*. After the tubercle has remained for a certain time in a state of crudity it increases in volume, loosens, and breaks up, being first converted into a tenacious, fatty substance like melted cheese ; and ultimately liquefies into a thin, whey-like fluid loaded with flocculi, the remains of the disintegrated tubercle. *Under the microscope* we find the change consists in the conversion of the blastema into a fluid loaded with exceedingly minute molecules commingled with fatty matter, whilst the nuclei and cells become irregular, more isolated, and dissolved. During this process, phosphate and carbonate of lime, with fatty matter, become blended with the tubercle, by which it is gradually thickened and converted into

a moist, unctuous chalk-pap, and eventually to a concrete mortar. Crystals of cholesterine may also frequently be seen commingled with the cretaceous matter.

The two cardinal forms present considerable variations, and seldom exude pure, but are blended the one with the other, making several varieties; and the softening, or malignancy, of the tubercle, is a spontaneous metamorphosis peculiar to it, and depends upon its character and the degree in which the one kind is associated with the other. Where the deposit has taken place at one period it commences in the central part of the mass, but where it has occurred at different times, and is of a varied character, the softening may commence at any part, even at the circumference.

There is also another form of tubercle—the *pigmentary*—depending upon the deposit of colouring matter in the substance of the other kinds, and is usually hæmorrhagic in its origin.

2. *Its Constitutional Characters.*—The deposit of the tubercle is essentially dependent upon a morbid condition of the blood—a dyscrasia, the result of which is that in the ordinary process of textural



nutrition the exuded blood-plasma, instead of being appropriated to the reparation of the tissues, or re-absorbed, becomes deposited and solidifies; this, in the majority of instances, is altogether independent of inflammation. Rokitansky considers the groundwork of tubercle to be fibrine, and the opinions that have been expressed by Dr. Hughes Bennett, of Edinburgh, with respect to its origin, seem not only to rest upon the soundest basis, but likely to lead to success in the treatment; viz., "that an excess of acidity exists in the alimentary canal, whereby the albuminous constituents of the food are rendered easily soluble, whilst the alkaline secretions of the saliva and pancreatic juice are more than neutralised, and rendered incapable either of transforming the carbonaceous constituents of vegetable food into oil, or of so preparing fatty matters introduced into the system, as will render them easily assimilable. Hence an increased amount of albumen enters the blood, and has been found to exist there by all chemical analysts, whilst fat is largely supplied by the absorption of the adipose tissues of the body, causing the emaciation which characterises the disease. In the meanwhile

the lungs become especially liable to local congestions, leading to exudations of an albuminous kind which is tubercle. This, in its turn, being deficient in the necessary proportion of fatty matter, elementary molecules are not formed so as to constitute nuclei capable of further development into cells; they therefore remain abortive, and constitute tubercle corpuscles. Thus a local disease is added to the constitutional disorder, and that compound affection is induced which we call phthisis pulmonalis, consisting of symptoms attributable partly to the alimentary canal and partly to the pulmonary organs."

That tuberculosis depends upon a degraded condition of the blood-plasma is most clearly shown by its affecting not only the lungs, but, when excessive, the structures of the body generally, and that it should select the lungs as its especial seat, is, I think, readily accounted for by the great vascularity of these organs, and the delicacy of their structures, whilst the atmospheric changes, in the way of temperature and moisture to which they are unceasingly exposed, tend to a constant alteration in the calibre of the capillary vessels, and thus favour

their congestion, and the transudation of the unhealthy liquor sanguinis from which tubercle is produced.

#### ITS CAUSES.

There is no subject in medicine which demands a more searching investigation than this, or one, I am convinced, that will lead to greater and more satisfactory results ; I shall, therefore, in elucidating this, carry my efforts to the full extent that the object for which these pages are written will permit, and endeavour to give to each its real significance. For, although hereditary predisposition is doubtless the chief source of this afflicting disease, and without which almost every other cause would appear to be inoperative, still it is rare that this is so strong as to engender it without some other constitutional or local excitant superadded to, and increasing this, such as an irritating or impure atmosphere, dyspepsia, insufficient exercise in the open air, prolonged lactation, mental anxiety, etc. It is proposed, therefore, to consider every source in detail, and thoroughly examine the bearing which each may have upon the others, for in this

way alone it is believed that just conclusions can be arrived at with respect to the value of each particular remedy, and that by adopting this course we shall steadily but surely continue, as hitherto, to diminish the appalling mortality of this most afflicting disease.

In order to arrive at correct deductions upon this subject we will commence with the following proposition ; viz., that for a given number of persons in a healthy district and with every condition to promote longevity a given number of cases of phthisis would take place : this, to my mind, has not yet been so clearly established as many would suppose, yet if it be not so, we are obviously responsible, directly or indirectly, for the 50,000 deaths which take place annually in England alone ; but assuming that it be impossible altogether to eradicate this disease, and such at the present time is probably the case ; for, although on the one hand, we may gradually rid ourselves of the predisposition, so on the other, the countless vicissitudes to which we are exposed will assuredly again light it up, to be re-developed or not in the succeeding generation, according as there is an ingraft to an unhealthy or healthy stock. Neverthe-

less, we endeavour to arrive at the minimum such as occurs in healthy standard districts, and then steadily pursue the investigation, and diligently and separately search out the cause of even these; and I feel assured that a rich reward will be the result of our efforts; if, for instance, we take the average of the eighteen standard rural districts of England, the mortality of which from phthisis is 2·23 per 1000 only, and in one of these, whose rate is a close approximation to the above and which I have well known for many years, it may safely be affirmed that several of the causes are more or less preventable, as the hereditary transmission; insufficient ventilation, especially of the dormitories; inadequate or improper food; and amongst the female population (in which sex phthisis invariably predominates in agricultural neighbourhoods) want of exercise in the open air. These causes, both severally and combined, are a fertile source of this disease, especially among the mothers of families who are worn out and exhausted with maternal and other duties connected with their household; and when tubercular deposit has commenced it is often too late to prevent the progress of this insidious malady, and

if once engendered is liable to be transmitted to the offspring; or, in other words, to be a source of hereditary transmission. Supposing, therefore, the 50,000 ascertained deaths from phthisis to be reduced to 40,000, which would be the case if all parts of England were as free from it as the eighteen standard districts, and then by a careful correction of the causes above enumerated even in these, we were to reduce the number for the whole of England 20,000 more; that is, 10,000 in the healthy and 10,000 in the unhealthy districts, of the possibility which I entertain no doubt, we should thus effect a saving of 30,000 lives annually out of the 50,000.

There is no disease, in my opinion, of a less specific character than this; that is, one of an uniform type produced by a specific and individual cause, to which alone I consider the term should be applied, but rather that it owes its origin to a great variety of circumstances, and is generated by any influence causing constitutional debility, and that it is the result primarily and essentially of these. It is desirable that this should be clearly understood, for nothing would be so likely to lead to injurious results

in practice as to regard it of this nature. We now proceed to the separate consideration of its causes.

1. *Hereditary Predisposition*.—A vast deal has been said about the hereditary transmission of phthisis, and the subject has been treated of, quite as a forlorn hope ; but, if preventive medicine be of any value, and I hold it to be the highest department of our science, why, may I ask, should it not be applied to this ? We know that with this question the deepest and most subtle of our feelings are mixed up, which it is often difficult to set aside or eradicate ; but, on the other hand, when we look at the terrible evils which result from the union of unhealthy parents leading to every species of deterioration, both of mind and body, it cannot be considered less than a most imperative duty on the part of parents and those who are the advisers and guardians of the young to tender their earnest and honest advice upon this, as upon every other subject where the welfare of their children or wards is concerned, and to give their most strenuous opposition to alliances, where either the one or the other are notoriously unhealthy or afflicted with hereditary disease, such as phthisis, scrofula, or insanity ;



there is a difference, however, between this and the other departments of preventive medicine, that whilst in the latter the laws may justly be brought into operation to compel obedience, in the former we must still adhere to the maxim of Plato, that, "We may endeavour to persuade our fellow citizens, but it is not lawful to force them even to that which we know to be best for them". Let every person who has carefully noted the consequences of these unhealthy unions, and traced them from sire to son, and seen, notwithstanding very often a numerous progeny, that each one either before or soon after arriving at maturity has sickened and died, and the name been blotted out from the land, and who, on the other hand, has not noticed that by engrafting a vigorous and healthy stock to one that has been diseased, that for a generation at least, the malady has been eradicated, to be reproduced, or finally annihilated, according as the succeeding generation selects a healthy or unhealthy partner, these observations are not mere idealities upon this subject but the result of cases actually witnessed. My grandfather died of phthisis at the early age of twenty-six, and several of his brothers were victims to the same



disease ; he married a vigorous and healthy woman, the result was that my father, although he suffered from bronchitis for many years, lived to within a few days of the advanced age of eighty-one ; he married a healthy woman, and the issue are eight healthy children, all past the meridian of life, and with tolerably vigorous constitutions. It would be easy to multiply instances such as these ; and, on the other hand, to show that the *physique* of families originally most sound, has become rapidly deteriorated by alliances of an opposite character, and if in making these, people were to think less of rank or position, often groundless, and more of mental and bodily endowments, they would most assuredly be consulting, in the majority of cases, their own and their children's permanent welfare. As an illustration of this, who has not noticed the rise and fall of families ; on the one hand, persons with scarcely any heritage except full intellectual and bodily vigour with an honest name raising themselves to the highest positions of honour and emolument, and even if this be accomplished but rarely in one generation, it is usually done in the next ; on the other, who has not seen in families with all the power and influence of hereditary rank to

support them, the gradual subsidence of their successors into mere units. This, as I have said above, may not be brought about in one generation, but, if similar conditions be perpetuated, is sure to be accomplished in the next. Nor do these observations apply to pulmonary consumption merely, which in very many cases may be considered only as a climax of that debility of constitution which, falling short of actual phthisis is the cause of a vast variety of other diseases.

2. *Dyspepsia*.—A healthy person with a healthy stomach should have little or no evidence of the existence of this viscus when it is empty, or even whilst digestion is going on; a sense of hunger, which is very much regulated by the requirements of the system, and limited to a short time before the accustomed periods for taking food, and when this is satisfied, a comfortable sense of repletion, are the only sensations that should be felt; when digestion has terminated, which takes place with an ordinary meal, in about two hours, there is usually slight thirst, indicating the necessity for a moderate amount of fluid which serves to dilute the chyme and carry it into the duodenum; the stomach after this

should be in a state of perfect repose, and a source of no discomfort from flatulence, eructations of acid, or any other evidence of disordered digestion, for the nerves of his stomach belong to the same system (the organic) as those which supply the other portions of the intestinal canal, as well as the lungs, heart, liver, kidneys, etc., the functions of which are all performed without any consciousness on the part of the individual, it is only when diseased that they are a source of uneasiness and pain ; and it is worthy of observation that, just in proportion as the duties of any organ are placed under our own control, so is it liable to be disordered ; the stomach, for instance, partly from want of knowledge of the proper system of diet, and partly from wilful irregularities, is far more frequently disordered than all the other viscera put together, and to this source we may, I am satisfied, trace very many cases of tubercular phthisis. They may, indeed, be frequently viewed as cause and effect, the dyspepsia preceding the deposition of tubercle, but irrespective of this, the nature of the deposit itself would lead to a like conclusion, and induce us to attribute this disease to a mal-assimilation of the food, the result of disorder of one or all of the processes

by which it is converted into healthy blood. In the treatment of it, therefore, it is most necessary that our attention should be directed to the proper regulation and improvement of the functions of the stomach and abdominal viscera.

3. *Insufficient Ventilation*.—This is one of the most constant and powerful causes of pulmonary phthisis, at the same time one that, in the majority of cases, easily admits of remedy, or, at least, of palliation, for kind nature in her abundance has supplied the air we breathe alike to all, and it is only the wilful exclusion of it by ourselves that prevents its vivifying influence being exerted on our systems. By the process of respiration the atmosphere is brought into direct relation with the blood itself, only a thin membrane intervening which easily admits the permeation of gases, and when *pure* air is admitted into the lungs it converts the blood, which reaches these organs in a state of impurity, and of a dark venous character, into a bright arterial red, rendering up at the same time one of the most powerful poisons, carbonic acid, and receiving in return the vitalizing principle oxygen, and unless each of these be effectually performed, every function in the body is sure to suffer;

for arterial blood being essentially the *pabulum vitæ* of the whole body, it is necessary that it should be maintained in a state of the highest purity, and this cannot be done without a copious supply of pure atmospheric air.

4. *Unhealthy Occupations*.—This subject is intimately connected with the last, for the greater part of the industrial pursuits of the country owe their unhealthiness to the deficient ventilation of the factories, workshops, mines, etc., in which the labour is performed ; but the inhalation of mechanical impurities, such as occurs in the manufacture of china and earthenware, in metal manufactures, as the pointing of needles and fish-hooks, the grinding of cutlery, etc., as well as the dust commingled with the atmosphere of mines, and in the manufacture of flax ; also rapid and extreme alternations of temperature, an overheated and too dry, or a hot moist atmosphere, such as miners and those to which the operatives in a variety of other employments are habitually exposed, have likewise doubtless (although the disease usually produced by these causes is chronic bronchitis and subacute pneumonia) a powerful influence in developing pulmonary phthisis where

there is any predisposition to this disease. The noxious exhalations and impure atmosphere of lead and other mines, the absence of sun-light, etc., exert also a most baneful and depressing effect upon the constitution, and contribute greatly to the production of the same results. Investigations upon this subject have been most elaborately conducted by Dr. Headlam Greenhow,\* and are calculated to produce the greatest good not only to the victims of disease, but also to every class by clearly pointing out the individual causes which contribute to swell the lists of mortality arising from this fatal malady.

5. *The Neglect of Personal Cleanliness.*—That “cleanliness is next to godliness”, has passed into a proverb is well known, and it is impossible to\* over-estimate the importance of attention to the agreeable as well as necessary duty of free ablution of the surface of the body, for without this the functions of the skin cannot be properly performed. By those engaged in manual labour, and especially in outdoor pursuits, the perspiratory glandulæ are suffi-

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\* See Report issued by the General Board of Health, 1858, and the third Report of the Medical Officer of Health to the Privy Council, 1860.

ciently stimulated to secretion and excretion, and no ill effects are likely to arise from slight irregularities in this respect; but to the sedentary and enfeebled the complete ablution of the body at least once a day by sponge or bath is absolutely necessary to preserve the health. It is estimated by Erasmus Wilson, F.R.S., that as many as 2,800 sudoriparous glandulæ exist in each square inch of the surface of the body, and as the number of square inches on that of a man of ordinary size is about 2,500, the pores would be 7,000,000, and as each tubule is about a quarter of an inch in length, the number of inches would be 1,750,000, or equal to nearly twenty-eight miles, and from the orifices of these tubuli there transudes in the form of perspiration upon an average nearly a pint and a half of fluid in the twenty-four hours, blended with a large quantity of effete materials, such as lactic acid, saline matters, etc. It has, moreover, been abundantly proved by experiment that the skin is an important medium for the aeration of the blood, and that when its functions are interrupted both the temperature and vitality of the system are lowered; the neglect, therefore, of personal cleanliness may reasonably be



considered as one of the causes of that debility of the system which tends to the production of pulmonary phthisis.

6. *Deficient Bodily Exercise*.—In order that the nutrition of the body may be well and healthily performed, a due amount of muscular activity in the open air is most essential. From the earliest period of time the mandate went forth, “in the sweat of thy face shalt thou eat bread,” and he who disobeys this law will be sure to bear the penalty in impaired health and bodily vigour; for without the exercise of the muscles the circulation becomes enfeebled, the lungs perform their functions imperfectly, the aeration of the blood is incomplete, and the oxygen consequently, which is necessary to give vitality and energy to the constitution, ceases to permeate the tissues, and every organ of the body languishes.

It has been before stated that this disorder has no specific characteristics, but that every cause which tends to produce debility of the frame engenders a predisposition to it; deficient bodily exercise, therefore, is a fruitful source of this disease.

7. *An Insufficient or Improper Diet*.—As a cause of phthisis I cannot but think that an *insufficient*



diet, in this country at least, has been very much over-estimated. The rate of wages in agricultural districts is, as a rule, lower than anywhere else, and the means, therefore, of supplying appropriate food proportionately deficient, and where there are large and very young families, absolute want sometimes prevails; yet in these cases, if the other conditions of healthy existence be present, such as free ventilation, good drainage, and sufficient sunlight, it is astonishing how little this cause alone seems to be productive of phthisis; and a ready explanation I think may be offered of this: modern chemistry, no less than Divine authority, teaches us that "Bread is the staff of life," and that it contains every element essential to the nutrition of the body; and although it may be necessary for an agreeable, healthy, and vigorous existence that this should be combined with other materials, and these of a varied character, such as meat, fish, fresh vegetables, butter, cheese, etc., still good wheaten flour contains as a basis all that is requisite for the support of the human system; in the country, therefore, insufficient food is seldom a cause of phthisis. When, however, there is an evident predisposition, and likewise in

the treatment of this disease, it is of the highest importance to select an appropriate diet, viz., one that is nutritious and easy of digestion, and in which the hydro-carbonaceous or fatty elements exist to the fullest amount that they can be digested.

With respect to an *improper* diet as a cause of phthisis too much cannot be said. The disease itself has for its origin a degraded condition of the blood-plasma arising from a mal-assimilation of the food, and nothing is so likely to aid in producing this as a disordered condition of the digestive organs, which is sure to arise if crude or improper materials be used, or if the food be taken too frequently. But to this subject we shall again refer, when we come to the treatment of this disease.

8. *Mental and Emotional Influences*.—Although the several parts of the nervous system have an action independent of each other, still in its entirety each part is so intimately, connected that if anyone be overtaxed, the influence that should be transmitted to the other is correspondingly diminished. We know, for instance, how little inclined we are to mental exertion for some time after a copious meal, because during digestion a large amount of nervous

power is directed to the stomach, and a rateably small proportion, therefore, is left for the exercise of the functions of the brain; hence there is, as everyone knows, a great disinclination to mental labour, and if this be indulged in the digestion of food is proportionately impeded, so likewise when the operations of the cerebrum, whether mental or emotional, be excessive, the organic functions, especially those of the stomach, are sure to suffer, and we have as a consequence deficient gastric secretion, and with it the varied symptoms of dyspepsia leading as a consequence to the mal-assimilation of the food which, as before stated, is the primary source of this disease. Mental and emotional influences, therefore, especially those of a depressing kind, take a high rank in the causation of this disease.

9. *Insufficient Clothing*.—Throughout the animal creation Providence has supplied to almost every species a covering either of hair or fur, to protect them from the vicissitudes and inclemencies of the seasons, leaving to man alone the exercise of his judgment, in supplying himself with this obvious want, especially in cold and temperate climates; and although it is more easy to trace inflammations of

the viscera, or rather of their coverings, to this cause, there can be no doubt, where there is a predisposition to this disease and the vital powers are low, that the want of appropriate clothing, by causing congestion of internal organs, leads to a dilated and unhealthy condition of the capillaries, and thus favours the deposition of tubercle; undue cold of the surface also has a tendency by itself to cause vital depression, and in this way to exert a pernicious influence on the system.

10. *Lactation*.—When it is recollected that the primary cause of this disease is a weakness of the digestive and assimilative powers, and that during lactation the energetic action of these is especially required to sustain the additional drain upon the system, it is not to be wondered at, that they should frequently fail. When, therefore, it is found that the constitution of the parent is suffering from this cause, as shown by the gradual attenuation of her frame, accompanied by other symptoms of debility, it is highly important that this natural and usually most salutary process should be discontinued, nor have we in the present day, with the improved methods of rearing children by artificial

food, any reasonable excuse for continuing it, where the health of the mother is palpably failing. Without any hereditary predisposition or other obvious cause, phthisis pulmonalis frequently dates its origin from the excessive exhaustion produced by lactation, even during the natural period, and when this has been easily borne throughout that time, if it be *prolonged* beyond it, as is frequently the case amongst the poorer classes, it tends to the production of the same result.

Lastly, *Climate*.—When the same means which exist in this country shall have been obtained elsewhere, of ascertaining with accuracy the death-rate and causes of mortality, we shall be able to pronounce with more certainty the degree of influence which climate, strictly so-called, exerts in producing this disease; the evidence, however, which we have hitherto been enabled to gather, all tends to show that from the Poles to the Equator phthisis is more or less prevalent, and that the disorder, therefore, is dependent rather upon the foregoing causes than on any deleterious influence that either a cold or hot, a dry or humid climate has upon the system, and so far from its prevailing in this

country to a greater degree than in any other, the more our inquiries are extended, the more they show that just in proportion to our advanced sanatory condition, it is very much less. That the difference is attributable chiefly to this cause is most evident from the great disparity that exists with respect to the prevalence of the disorder, even in this country, between the healthy and unhealthy localities, and between the inhabitants of cities and towns and those who reside in the country, and we gather from this the chief remedy, viz., attention to those laws by which our system is maintained in a healthy condition.

The subject of climate will be referred to again when we come to the hygienic treatment of this disease.

#### THE SYMPTOMS.

For the purpose of giving these with greater exactness, phthisis is usually separated into three stages; but, before this is done, it will be necessary to make a few observations on that constitutional state which usually precedes the deposition of tubercle, and is almost a necessary condition to its formation; this has been termed—

*The Pre-tubercular stage.*—It is a matter of the highest importance that this stage should be clearly understood, for it is at this period that the disease, if it can yet be so called, is especially amenable to treatment, and which, if proper hygienic rules be adopted, and the exciting cause removed, will, unless the hereditary predisposition be very strong, generally admit of cure; and it is a principle that may be laid down in the treatment of this disorder that just in proportion to its progress and duration, so is it the less remediable; there can be but little expectation of a permanent cure when the deposit has taken place in a degree sufficient to impede the circulation through, and interrupt the nutrition of the textures, and the chances of recovery are still more remote when loss of substance has occurred, and the tubercular matter, with lung tissue, has begun to be copiously expectorated; yet this latter stage is often allowed to supervene before the patient is advised to adopt that change of residence which frequently offers the only hope of a restoration to health.

*Symptoms.*—These are a coated tongue, with loss of appetite, and an irregular state of the

bowels; a pallid countenance, or a sallow one, if any of the viscera, such as the liver, kidneys, or skin, be performing their functions imperfectly; there are also languor of the body and loss of weight, and the pulse is generally smaller and quicker than usual; we have, in fact, all the symptoms of general debility; at this period there is usually little or no cough, and it is likewise at this particular stage, when the cause can be traced out and removed, that we can augur most hopefully of the result: but if, on the other hand, there be associated with any of the other causes a strong hereditary predisposition, as indicated by one or both parents having died of consumption, or any of the sisters or brothers, it is impossible to speak so favourably of the issue, the exciting cause, however, should be discovered; for when it has been produced by excessive mental labour, close confinement to business, over anxiety, late hours, immoderate indulgences, prolonged dyspepsia, etc., the removal of these will often be attended with marked success, and the patient placed in a favourable way for recovery.

*The First Stage of Phthisis.* 1. *Symptoms.*—These



are the same as the foregoing, only in a more marked degree ; the pulse is increased in frequency, the tongue is more coated, especially at the base, whilst the tip and edges are red ; the appetite and strength also fail, the respirations are increased in frequency, the breathing is oppressed, and sometimes at this early stage there are copious night sweats ; the cough, at first dry, is after a short time attended with more or less expectoration, which is frequently streaked with blood. I have known more than one instance in which the earliest indication of phthisis was a somewhat copious hæmorrhage, which usually takes place in the night ; this is succeeded by pain at that part of the lungs from whence it has proceeded, which gradually subsides, and the patient often appears for some time quite well, but in the majority of cases, at no very remote period, unequivocal symptoms of phthisis set in:

2. *Physical Signs*.—The earliest *stethoscopic* evidence of the deposition of tubercle is a weakness of the inspiratory murmur, this may generally be known by comparing the two sides of the chest above and beneath the clavicles, and is produced

by the deposition of the tubercular matter interrupting the free expansion of the lungs, and therefore the easy transit of air; from the same cause, and likewise from the impaired elasticity of the lung-tissue, the expiration also is prolonged, whilst both in inspiration and expiration there is a harshness, and as the disease proceeds, an irregularity of the respiratory murmur, which gradually merges into the dry, crackling rhonchus, which, when it occurs, is very characteristic of this stage. Bronchial breathing, also, or an increased loudness and harshness, accompanied with a blowing character of the respiratory murmur over parts usually affected with phthisis, are additional evidences of the tubercular deposit. There is also bronchophony, or an increased loudness of the voice in parts where it is not naturally heard, as, for instance, beneath the clavicles, and if the patient be directed to cough we have the bronchial cough. *The sounds of the heart* also merit attention, for if these be heard more on the right side than on the left, or even in the same degree, there is probably consolidation of the upper lobe of the right lung. *On percussion*, likewise, the sound is materially

modified, and, conjointly with the rest, this symptom is of the highest value ; but, like nearly every other when taken separately, is of very little diagnostic importance, for it is well known that tubercles may exist in the lungs to a limited degree, or when they are diffused, and especially in young persons, without giving the slightest evidence by percussion of their presence ; in most cases, however, as the disease advances, and often, at its earliest periods, the evidence that percussion affords is of the greatest use, especially on comparing the opposite sides of the chest beneath the clavicles ; at the same time due attention should be paid to the parts above, and to the supra-scapular regions, for it is here that the earliest symptoms of phthisis generally reveal themselves. *The altered form in the parietes of the thorax* should also be carefully noted ; this consists in a flattening of the chest beneath the clavicles, producing a diminished capacity in its antero-posterior diameter, and is caused either by the tubercular infiltration interrupting the free expansion of the lungs, or by subsequent inflammation of the lung-substance and atrophy of the air-cells, or by pleuritic inflammation and adhesion drawing

inwards the parietes ; the altered form becomes more and more evident as the disease advances, gradually throwing forward the cervical and dorsal vertebræ, and causing a bending forward of the whole body ; and as the form of the chest becomes altered the *movements* are diminished in a like degree, so that after a time there is very little, if any change, at the upper parts of the chest during respiration, or even on a forced inspiration.

*The Second Stage.* 1. *Symptoms.*—These are the same as in the first stage, but more defined, and it is mainly by the stethoscopic signs that we can distinguish between the one and the other ; there is usually, however, at this period considerable pain above and beneath the clavicle, for the disintegration of tissue which has now taken place is always attended by some inflammatory action ; and when this extends to the pleura, which it often does, it is generally acute and lancinating.

2. *Physical Signs.*—The earliest evidence of this stage is the humid, crackling rhonchus ; and it is equally characteristic of the second, as the dry, crackling rhonchus (which it usually succeeds) is of the first ; it therefore enables us at once to deter-

mine with certainty that the tubercular matter has begun to soften, and involve in its disintegration the destruction of the lung-substance in which it has been deposited, and which, by the aid of the microscope, may generally be detected in the expectoration. This humid crackling is a sharp, clear, clicking sound, occurring as a rule only once or twice during an inspiration ; whereas the sounds in bronchitis are of a bubbling nature, less distinct, and more frequent ; the one, however, is frequently blended with the other. As the softening proceeds, the surrounding parts become more and more liable to inflammation, which attacks principally the capillary bronchial tubes ; we have therefore, as a secondary result, the sub-crepitant rhonchus ; and when the larger ones are implicated, the sonorous and sibilant rhonchi, and occasionally the lung-substance itself is involved, producing the fine crepitation of pneumonia ; at other times the pleura is affected, as shewn by the pleural friction-sounds.

At this stage also the altered configuration and impaired movements of the chest, and the flattening beneath the clavicles, especially on one side, are all more evident ; and if the hand be applied to the

apex, or upper part of the thorax, and the patient directed to cough or speak, the tussive or vocal fremitus will be very marked, and on *percussion* the deposit will be readily recognised by the peculiarly dull and heavy sound, widely different to that over healthy lung. The above is an outline of the principal signs of this stage, and although we cannot expect in any case that all of them will be present, they are usually in sufficient number to render it easy of detection.

*The Third Stage.* 1. *Symptoms.*—In this there is still an increase of every symptom; the cough is painful, hollow, and almost incessant; the night-sweats copious; and the pulse very rapid, from 100 to 130 or 140 in the minute; the breathing likewise is oppressed, and the legs become œdematous; the tongue is sometimes of a glassy red, at others thickly furred, and at the very last aphthous; frequently diarrhœa sets in from the irritation of the tubercular matter which has been deposited in the lining membrane of the bowels, and this soon carries off the patient.

2. *Physical Signs.*—In this stage a large amount of lung-tissue has been expectorated; and with the

formation of cavities, changes in the auscultatory sounds take place which require consideration. They may be divided into those produced by respiration ; by the voice ; the cough ; the action of the heart ; and by percussion.

1. *Those produced by Respiration.*—Cavernous respiration is recognised by its dry, hollow, blowing, and metallic character ; and when the cavity is considerable, the sound is similar to that produced by blowing into an empty bottle, and is therefore termed *amphoric*. We can usually estimate the size of the cavity by the loudness of the sound ; still there are a variety of circumstances which may interrupt this, as when the vomica is filled with its own secretion, or the bronchial tubes leading to it are blocked up, or the respiration is so feeble as to produce no sound. By directing the patient, however, to cough, by which the cavity is cleared, or to inspire deeply, we can generally detect it. The cavernous rhonchus differs in its character according to the amount of the secretion and the size of the cavity, being at one time of a gurgling or sibilant kind, and completely masking the cavernous respiration, and at another, of a metallic nature.

Pleural friction-sounds are also frequently heard in the neighbourhood of the vomica.

II. *By the Voice*.—If the stethoscope be applied over the trachea, and the patient directed to speak, the voice sounds as if it were passing directly into the ear; and if there be a cavity in the lungs, and the instrument applied over it, the same distinct articulation is produced. This is *pectoriloquy*, or tracheophony, heard in an unnatural situation, which latter term Dr. Billing proposes to substitute for the former.\* Where the cavity is large and empty there is a still further modification of the voice, the *amphoric voice*.

III. *By the Cough*.—When there is a vomica, if the patient be requested to cough, it is of a peculiar, hollow, ringing, and metallic character, this is termed the *cavernous cough*; and when the cavity

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\* "I am borne out in discarding the term 'pectoriloquy' for '*tracheophony*' by the established usage of '*bronchophony*' and '*puerile respiration*,' natural sounds which are acknowledged as morbid signs, whenever they are found in a wrong place. Besides which, by learning the sound of tracheophony, we are prepared to detect it when it becomes a morbid sign."  
—Billing *On the Lungs and Heart*, p. 4.



is empty and extensive, the sound is still further changed, and it is then called *amphoric*.

iv. *By the Action of the Heart*.—In the third stage of phthisis, so great is the attenuation of the body and loss of lung-substance, that the sounds of the heart are not only heard more distinctly than usual, but in many instances the impulse also may be seen and felt; and when the cavity is on the left side, the sounds are more evident at the second intercostal space than in their normal position at the fifth; and if the cavity be on the right side, they are better heard beneath the clavicle on that side than at the fifth intercostal space on the left. This arises from the displacement upwards of this organ, the result of a partial cicatrization of the cavities. *Pericardial friction-sounds* and *endocardial murmurs* are also not uncommon. *Arterial blowing sounds* are also sometimes heard beneath the clavicles, especially on the left side, and are caused by the drawing inwards of the walls of the chest, and the contraction of the cavities impeding the circulation through one or more of the great vessels at the base of the heart.

v. *By Percussion*.—This varies according to the size

and number of the cavities. When these are small, their partial occupation by muco-purulent matter, and the consolidation of the surrounding tissues by sub-acute inflammation and tubercular deposit, more than compensate for the loss of substance; and there is, as in the former two stages, a preternatural dulness; but as they increase in size, the sound becomes more resonant, and at last almost *amphoric* in its character.

*Pneumothorax*.—Dr. Somerville Scott Alison, in his work on *The Physical Examination of the Chest in Pulmonary Consumption*, states that he has found this so common an event as to render it desirable to assign to it a separate stage, the *fourth* or concluding one of this disease.

It usually occurs at an advanced period, and the physical signs vary according to its extent and the pathological condition with which it is associated. If the quantity of air be great, there are a considerable bulging of the intercostal spaces, with lessened respiratory movements, and a morbidly clear or tympanitic sound on percussion, and the respiratory murmur will be either very feeble or inaudible; or if the air, during respiration, passes freely in and

out of the newly opened cavity, it may be of an amphoric character. At the same time, from its pressure upon the vomica in the lung, all signs of this may disappear; and when it is very considerable, there may be a proportionate displacement of the position of the heart.

After a time, especially if the quantity of air be large, fluid collects in the cavity of the pleura, and we have all the symptoms of *hydro-pneumothorax*, viz., the absence of the respiratory murmur, and when the patient is in the upright position, a dullness on percussion at the base of the thorax, which abruptly changes at the surface of the fluid to a clear and tympanitic sound; this, however, varies with the position of the invalid. The *metallic tinkle and echo* are also sometimes heard, and by placing the hands on the shoulder, and gently agitating the thorax, a *splashing noise* can often be evoked.

#### THE TREATMENT.

This may be divided into the hygienic and medicinal.

1. *The Hygienic*.—A careful consideration of the *causes* of consumption will give to this part of the

treatment a large degree of prominence; for it is by the avoidance of these, and the substitution of conditions of an opposite character, that we shall best secure immunity from it; and even when the seeds of the malady have been, as it were, sown in the system, if this be not too far advanced, attention to those rules by which the body is maintained in a healthy condition will be found to offer the best and often a certain remedy. By pursuing, therefore, in detail each separate cause, as previously given, we shall readily be able to comprehend the most appropriate treatment.

1. *Hereditary Predisposition*.—But little further than has been already advanced, need be said on this question; I must therefore refer my readers to pages 213-4-5-6, and merely repeat that it is our duty to adopt every means calculated to lessen this, the greatest of all the sources of pulmonary phthisis.

2. *Dyspepsia*.—The hygienic treatment of this subject, as a cause of phthisis, is so intimately associated with the dietetic and medicinal, that it is thought best to leave its consideration till we come to those parts of the treatment of this disease.

3. *A free Supply of pure atmospheric Air.*—There is no subject in connexion with the treatment of phthisis of greater importance than this; every means, therefore, should be adopted to obtain it in a state of the most absolute purity, especially in our *dormitories*. For some years it has been a stereotyped observation with me, that we bestow a great deal of attention on the ventilation of our bedrooms after we have left them, and very little whilst we are in them. Let any person, by way of experiment, pass out of his sleeping apartment for a few minutes in the morning, the doors and windows of which have been closed throughout the night, and then re-enter it, and he will have abundant evidence, from the odour, of the impure condition of the atmosphere he has for some hours been inhaling. The remedy for this is both safe, and easy of application, viz., to leave the window open at the top for an inch and a half or two inches both day and night; or a part of the window may be made of perforated glass or zinc; or one, two, or more air-bricks can be placed in the outer wall. This will keep the room sufficiently aired during the night; and all that is necessary in the day-time, in addi-

tion, is to throw the door open, and the purification of the atmosphere will be complete.

I have been accustomed, now for two or three years, to adopt the first method, and with most evident comfort. I first experienced the advantage of it whilst suffering from considerable mischief to the upper lobe of my left lung ; whether of a phthisical nature or not, is a matter of doubt. It is sufficient to say that I am now quite well ; but at that period I had night-sweats, a rapid pulse, quickened respiration, a severe cough, and expectorated blood ; and at about two o'clock in the morning, my bedroom, although large and lofty, felt so suffocative that I was compelled to get up and open the door, and sometimes the window, before I could be relieved ; but by keeping the window open in the way described, the necessity at once ceased, and I had a long, tranquil, and refreshing sleep, and with it a cessation of the night-sweats and other unfavourable symptoms.

In making these observations, however, it should be recollected that I am speaking of the *hygienic* treatment of pulmonary phthisis, or the art of preventing this disease ; and of all the means for

preventing it, or, in its early stages, of restoring a patient to health, I consider the free supply of pure atmospheric air, especially during sleep,—in which, upon an average, we pass one third of our lives,—is one of the most effectual ; but when the disease has reached the second or third stages, there may be a variety of circumstances and seasons in which the exposure may be unadvisable or even injurious. I doubt very much the desirability of a communication with the chimney, either at the fire-place or by a ventilator ; for the air in it, which, without a fire, as frequently passes down as up, is sure to be commingled with dust, and is often of a very impure nature. Nor do I think an interchange with the hall and staircase at night, when the outer doors are closed, either safe or sufficient, unless the water-closets have an arrangement of their own for ventilation, and are separated from the interior of the house by at least two doors. Under other circumstances, the poisonous gases which, notwithstanding all our care, force their way into the closets, will be sure to reach the other parts of the establishment.

On the apartments occupied during the day, less attention need be bestowed ; for the frequent in-

gress and egress of persons, and the doors being unclosed a large portion of the day in summer; and the open fireplace in winter, towards which, when in use, a current of air is constantly passing, are usually sufficient to ventilate them effectually, except in the evening, when, with closed doors, and especially if gas be used, the atmosphere of a room frequently becomes impure and oppressive; the door, therefore, should be occasionally thrown open to give a fresh supply, as well as reduce the temperature.

4. *The Avoidance of unhealthy Occupations or Amusements.*—That a large degree of the mortality from pulmonary phthisis arises from these causes, the records of our consumptive hospitals and mortality-tables abundantly shew. By the careful avoidance of them, therefore, or if that be impossible, of the pernicious influences with which they are associated, we may hope to accomplish a vast saving in human life; for it has been found that the baneful effects of these occupations are the result, not so much of the industrial pursuits themselves, as of the preventable conditions with which they are connected. The Reports before referred to, upon this



subject, by the General Board of Health in 1858 and 1860 ; and another in October 1864, by a commission appointed to inquire into the sanitary state and influence of mines, all tend to prove that it is mainly from deficient ventilation that the mortality arises ; and this is in strict accordance with the most recent philosophical investigations on the process of respiration, by which it has been shewn that where the atmosphere is contaminated with a very moderate amount of carbonic acid, it seriously impedes the exhalation of more ; and in that way contributes, not only to the deterioration of the arterial blood by its retention of the carbonic acid, but also, by the insufficient absorption of oxygen, impedes the due elaboration of the blood-plasma, so essential to the healthy performance of the varied vital processes, both nutritive and secretive, that are constantly going on in the system.

Hence it is of the highest importance to those engaged in these pursuits, as well as the duty of their employers, to attend to this ; and it is quite certain that a large reduction of mortality will follow. On the other hand, it is most desirable that those who are blest with an abundance of this

world's goods, should give to this question their earnest attention; and avoid those recreations and amusements, such as balls, theatrical and musical entertainments, which, from over-crowding, are not only associated with bad ventilation, but likewise rapid alternations of temperature, late hours, etc., all of which are so injurious to the consumptive.

5. *Personal Cleanliness*.—To the observations that have already been made at pages 220-1, but little need be added, further than to state that attention to this may be considered as one of the means by which the body is maintained in a healthy condition, and for the purpose of warding off the disease, sea bathing\* is a grand prophylactic, for sea water contains a variety of ingredients that exert a most beneficial influence over the functions of the skin, stimulating their glandulæ, and promoting the excretion of effete materials, and thus

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\* At West Worthing many of the houses are supplied with sea-water; and public baths of large dimensions are being erected, with a constant supply of fresh sea-water, which may be used at any period of the tide; and it is proposed to raise the temperature of the water during the colder months, so that they may be used throughout the year.

tend to the purification of the blood, and by its bracing effects, to the general invigoration of the system ; when, however, this cannot be used, as in confirmed phthisis, especially in its more advanced periods, sponging the body with cold or tepid seawater, or the use of the tepid bath, according to the stage of the disease and the condition of the patient, is most desirable.

6. *Bodily Exercise in the Open Air.*—It is well known that nothing is so conducive to the maintenance of the system in health as muscular exertion in the open air ; it is not sufficient that this should be performed in the house ; for sun-light, change of scene, and the higher degree of purity of the external atmosphere, seem essential to the invigoration of the system, nor need this be limited to any particular stage of the disease, for so long as the strength permits, and there be no cause to prevent it, exercise may be freely taken, and the more the patient is capable of the more likely he is to be benefited ; in winter, however, it is desirable that this should be done in the middle of the day, as between 10.30 A.M. and 3 P.M., and in summer the mid-day sun should be avoided, the best time

being from 10 till 11 A.M., and from 3 till 6, or even 7 P.M.; whilst in the spring and autumn those hours may be selected that are most agreeable to the patient, but no absolute rules can be laid down on this subject; it should rather be left to the guidance of the physician and the feelings or convenience of the invalid.

7. *The Diet.*—Where there is a tendency to phthisis it is of the highest importance that an appropriate diet should be selected, and that this should be taken at suitable intervals; it is from inattention to these points that the distressing disorder, dyspepsia, which almost invariably accompanies the disease, is so general. I cannot subscribe to the doctrine of “little and often” for food to be taken—in the advanced stages of this disease, when the powers of the stomach, in common with the rest of the system, are nearly lost, and liquids therefore are required to nourish the body, there is no doubt, from these being taken up through the walls of the stomach by direct absorption, that they should be given at short intervals, but when the digestion of solid food is to be accomplished, and the efforts of the stomach are

to be fully called forth (and it is only by such that the healthy nutrition of the body is maintained), these I am satisfied are best fulfilled by a varied and copious meal taken at considerable intervals.

Celsus, nearly 1700 years ago, in his instructions for healthy persons, wrote "take food twice a day rather than once, and always as much as you can digest;" he said nothing about three times, and although I do not concur entirely with this doctrine, or advise it for the delicate and those predisposed to consumption, still it conveys a principle which ought never to be lost sight of in the preservation of health, which should be our chief consideration in the treatment of this disease, viz., that the stomach, as a viscus, requires prolonged intervals of repose, and, when this is given, that copious, varied, and nutritive food may be taken with the utmost benefit; indeed, I believe it is the only way that the complete nutrition of the system, and therefore an arrest of phthisis, can be effected.

But to give these observations a practical bearing, I will observe that whilst I consider that men in perfect health (women seem to need it three times) are best sustained in it by two good meals a

day; say a breakfast at 8·30 or 9 A.M., and a dinner at 4·30 or 5 P.M., some tea being taken as a diluent about two hours after the last meal is completed; still, as there are many persons with whose duties so early a dinner would interfere, and by whom it would be unwise to prolong the interval between breakfast and dinner; for these I would advise a light breakfast at 8·30 or 9, luncheon at 1·30 or 2, a dinner at 6 or 7, and after an interval of two hours, a cup or two of black tea, not too strong, and without food, should be taken, so as to wash out, as it were, the stomach thoroughly, and give to it and the whole system absolute repose during the night; in this way dreaming and wakefulness are avoided, and both are fitted vigorously to perform their duties in the morning, the one digesting with ease and advantage a substantial meal, the other with pleasure performing its mental and bodily labours.

To others the following is best adapted: a breakfast at 9 A.M., a dinner at 1 or 2, tea, without food, at 5, and a light supper at 7 or 8; but where phthisis has actually set in, and the disease advanced beyond the first stage, it may be necessary

that broth, beef tea, or milk, if it agrees, should be taken in addition ; but at this period no particular rule can be laid down that shall be adapted to every individual or every case ; each one must receive special attention ; still it may be stated that the diet, in every stage, should be of a character that is highly nutritious and easily digested ; animal food, or fish, should be taken once, and in moderation twice, a day, and a large proportion of fatty and saccharine matter ought to be blended with the repasts, and those beverages used that are found to agree best with the stomach, and leave it, after the digestion of a meal, free from acidity, flatulence, heartburn, or other symptoms of dyspepsia ; at one time water, or good claret, either diluted or alone, may be the most suitable ; at another the bitter or mild ales, or porter, or weak brandy-and-water, port, or sherry may be taken ; but if either of the latter bring on dyspeptic symptoms, they should be avoided, for it is quite certain that the body is best supported by maintaining the stomach in a healthy state, and that stimulants ought never to be allowed to interfere with the digestive process, under the impression



that they are necessary to sustain the system. It is quite true that moderate stimulants assist in calling forth the powers of the stomach, and therefore, as a rule, should be taken; but if they tend, in any way, to bring on gastric irritability, water, or the mildest beverages, should be substituted until the stomach is restored to a healthy condition, when they may again be resumed with advantage.

8. *Mental Influences*.—Where there is a predisposition to this disease, hereditary or acquired, it is of the highest importance that undue mental labour should be avoided, such as excessive study, the cares and anxieties of business, etc., and depressing emotions should likewise be shunned; these are best fulfilled in conjunction with the hygienic rules enumerated elsewhere, as change of scene and air, cheerful society, and out-door pursuits, of a nature and degree to invigorate the system without bringing on exhaustion.

9. *Sufficient and appropriate Clothing*.—When, in this disease, the low condition of the vital powers, and with it the deficiency of animal heat, are remembered, it must be obvious that sufficient and appropriate clothing is most essential, and from



its non-conducting power, there is none in this climate equal to woollen. Flannel should be worn next the skin both in winter and summer, to equalize the temperature, and allow the free exit of perspiration from the surface of the body; the same flannel, however, should not be worn during the day as at night, and it is very questionable whether it should be used at all when in bed. I very much prefer a cotton dress only, because it is quite easy to keep up the temperature of the body with the bed clothes, and the good effect of the flannel during the day is, I believe, very much increased provided it be not worn at night. It need scarcely be said that no form of dress, either for men or women, should be so tight as to impede the free movements of the lungs or limbs, and that anything approaching to what is commonly called "tight lacing" should be scrupulously avoided.

Lastly, *Climate*.—This subject has engaged for many years a large share of my attention. The value of *change of air*, and especially from the interior to the sea-side, is now so universally recognised, and its effects so evident and well understood in all diseases of debility, particularly those

of a strumous or scrofulous nature, that it is unnecessary to do more than allude to it with a view of showing the cause of its beneficial influence in phthisis pulmonalis; for this latter disease may be considered as closely allied to the former; when, therefore, we see that *external* glandular swellings, with their unorganisable deposits, disappear under the influence of a marine atmosphere, we have every reason to hope for a like result in *internal* diseases of a similar character; and it has always appeared to me that we have a key to the value of a sea-side residence in consumptive diseases when we discover that these external deposits vanish under its influence, and that we may reasonably expect the same result in phthisis, when it consists solely of this deposit, unaccompanied by the after results—inflammation and ulceration. When these have taken place we have to combat the superadded constitutional symptoms, which, whilst they increase most materially the difficulties of the case, render it by no means hopeless, for the cause of the impaired health being removed, if there be no fresh addition to the deposit, that which already exists may become partly absorbed, the remainder quiescent, and

the healing process established in the ulcer itself. Dr. Hughes Bennett, of Edinburgh, has given some most interesting illustrations of this result made from *post mortem* examinations, which leave no doubt that it frequently takes place when the patient is placed in a favourable condition for recovery.

It is also well known that a sea-atmosphere contains several ingredients most valuable in the treatment of scrofula, as the saline materials, iodine, etc.; and although, as I have stated elsewhere, this latter ingredient has never been actually detected in the *air* of the sea, yet, as it is found in sea-water, and in marine plants and animals, and as the odour likewise of the sea, and especially of sea-weed, is essentially that of iodine, we may reasonably accept as a fact, that it does exist. These principles, then, instead of being received into the system as a medicine, through the medium of the stomach, are brought far more directly, by the aid of the atmosphere during respiration, into relation with the blood itself, are absorbed by it, and with it permeate the minutest tissues; and when we further consider the nature of the respiratory function, its un-

ceasing action, that there are from fifteen to eighteen respirations in each minute of time, and that about twenty cubic inches of air are exchanged at each respiration, we may readily understand the *value and magnitude* of the remedy comprised in the words "change of air," without associating with it any other circumstances, such as new scenery, altered habits, etc.; and although admitting the usefulness of the latter, I will venture to add that all the good that has ever been derived from the former is traceable *mainly* to the difference between the relative constituents of the atmosphere of the place where the person has resided, and the one he has selected. Nor should we forget that this influence is doubled, trebled, or even quadrupled, when the patient's home has been in the interior of a large town or city, the atmosphere of which is loaded with carbonaceous and other impure materials, or in a neighbourhood where the soil is clayey and undrained, and therefore impregnated with malaria. There are many localities, I am satisfied, which, although not insalubrious enough to cause intermittent fever, yet the exhalations from which, especially in the spring of the year and at the fall of the

leaf, are quite sufficient to produce a most depressing influence upon the system. Let the patient remove from these to a healthy sea-side resort, such as Worthing (and doubtless many others may be mentioned), at which, when the wind blows from the north, there is a mountain breeze, and when from the south, those from off the ocean, and the benefit will be most marked. Nor can we consider this result as uncertain and accidental, but rather as the effect of a clear and well-defined cause, the action of which we may look for with the same confidence as that of any other remedy.

Nor must we omit to notice the other atmospheric constituents and conditions. The sea, as is well known, covers about three-fourths of the surface of the globe, and from it the moisture of the atmosphere is chiefly supplied. At sea, therefore, and on the coast, whilst the average amount of humidity is greater than on the land, which becomes more and more evident as we leave the ocean, and especially when we reach the interior of large continents, yet from the fluctuations in temperature being very much less, the deposition in the form of dew, and the condensation of the moisture of the atmosphere

as fog, are as a rule less frequent and abundant at sea and on the coast, than in the interior;\* there is an equability of humidity, therefore, at sea and on the coast which is very favourable to recovery from lung-diseases.

With respect to the ozone or chlorine of the atmosphere, the quantity of this is so minute that it is impossible to assign to it any special influence on the lungs and air-tubes: if there be any, it is that of a mild and salutary stimulant; but considering the extent of its source and diffusion, as well as its effects when in a more concentrated state, we may safely regard it as the great purifier of the atmosphere, by blending with and neutralizing the effects of those accidental organic ingredients which con-

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\* A variety of circumstances will, of course, frequently modify this, such as warm currents, like the Gulf-stream in the ocean, which carries with it a warm atmosphere charged with moisture, and this commingling with a colder one, as occurs off the banks of Newfoundland, causes the very dense fogs which are the terror of mariners in that locality. This warm, moist air also coming in contact with the colder shores of the Channel Islands, produces the same effect; but there are not at sea and on the coast, as a rule, those morning and evening fogs which prevail in some inland neighbourhoods for several weeks or even months in the year.

tribute so largely to the unhealthiness of densely populated neighbourhoods; and to this we may reasonably ascribe the well-known salubrity of our towns on the coast, when there are no local causes in existence to counteract it.

As regards the *temperature* of the air, we have no proof that this has any influence in arresting phthisis. All our inquiries, so far as they have gone, tend to shew that in every latitude consumption is more or less prevalent; but that for its *prevention* a moderately cold climate is the most useful of the two; and we who reside in a temperate one, and know the bracing influence of cold, and the exhausting effects of heat, may gather with tolerable accuracy the results that are likely to be produced by them severally on the system.

In the early stages, therefore, of this disease, when the vital powers are sufficiently good, and the patient able to bear it, he should try, in summer, the mountain air of Scotland, or a journey to northern Europe, and migrate to the south of England in winter; and, if possible, select a residence with a southern aspect. It is, however, a mistake to suppose that the south coast is hot in summer;



it is one of the most temperate parts of England, and for the most obvious reasons,—the prevailing winds throughout these islands are from the south-west. \* These reach the shores of the south uninfluenced by any land, and are therefore at all times cool and refreshing, and sometimes even cold, up to midsummer ; so much so that visitors who sojourn here in summer, can scarcely believe that it is warm and mild in winter ; and it is nothing but the patent fact of the luxuriant condition of our evergreens and exotics, such as the myrtle and magnolia, which flourish well in the open air, that testify unmistakably to it. The explanation of this also is readily given. The sea, during winter, is a great magazine of heat which it has progressively collected during summer ; for the sun's rays, when they impinge upon it, instead of being reflected as by the land, are, like the rays of light, absorbed ; and when the sun ceases to give its benign influence, the sea in a large degree supplies its place by rendering up to the atmosphere during winter the heat which it has accumulated in summer ; offering a striking contrast, in this respect, to the much vaunted climates on the Continent, which, receiving



but little warmth from the ocean, have to depend almost entirely upon that of the sun; the fluctuations, therefore, throughout the day and year, and from day to day, must be very much greater.

There is another reason also why the climates of these islands, and especially of the south and south-west coasts, surpass those of the Continent, viz., that they are fully exposed to the benign and tempering influence of the Gulf-stream, which crossing the Atlantic from south-west to north-east, impinges especially on the shores of Britain and western Europe, at the same time approaching but little if at all the Mediterranean coasts; for although an upper current is constantly setting in through the Straits of Gibraltar, and a lower one out of it, still the influence of the waters of the Gulf-stream must be very inappreciable on those of the Mediterranean. The effects of this stream are no doubt felt on the western shores of France in common with those of the British isles; but they gradually cease as we recede from the coast, and after a few leagues are altogether lost.

It will thus be observed that my opinion is entirely in favour of the climates of these islands

over those of the Continent ; for I have shewn that in winter we have two sources of heat, whilst they have only one. It is true that the shores of the Mediterranean are a few degrees further south, and that the heat of the sun is greater ; but as the temperature is almost entirely dependent on it, every passing cloud is more sensibly felt, and the mornings and evenings are likewise colder. It should be recollected, however, in selecting any residence, that no two places in these islands, and scarcely if we include the Continent, differ so much from each other as two days may do in the same place ; for it will often happen, after some weeks of delightful weather and breezes from the south, that the wind suddenly changes to the north, with a reduction of ten or fifteen degrees of temperature ; and if this takes place in the autumn of the year, invalids sometimes wonder how they shall get through the winter ; but after a few days the wind again changes to the south-west, and all the genial influences of our climate reappear ; and with these alternations the winter is usually passed over far better than is anticipated.

I have before said we have no proof that either a

hot or cold climate has any influence in arresting phthisis ; but we have tolerably conclusive evidence that an *equable* one has, and that it is also most conducive to longevity ; for instance, in the Faroe Islands, according to Dr. Panum, “the period of death by old age is from the eightieth to the ninetieth year ; that is, many more deaths happen within that decennium than any other after the first year of life.” In the Hebrides also, and the deeply indented north-west coast of Scotland, in which the ranges of temperature are exceedingly small, the non-prevalence of pulmonary phthisis has been especially noticed ; and in the Orkneys and Shetland Islands the same immunity appears to prevail. The Isles of Wight and Anglesey also ; the county of Devon ; and, from the reports of Dr. Greenhow, parts of Cumberland and Northumberland, both of which counties, on account of the narrowness of that part of England, are fully exposed to the moderating influence of the ocean ; and likewise the county of Sussex, which along its line of coast, as a rule, has very small ranges of temperature, are all unusually exempt from this disease.

On the other hand, so far as evidence goes, where

the fluctuations are excessive, as in the interior of large continents, they tend gradually to deteriorate the health and stamina of the inhabitants, and consequently lead to the production of phthisis. The naturalized American, at least in the United States, after two or three generations, is widely different in *physique* to his forefathers ; and were it not for the constant influx of the best blood of these islands and northern Europe, would rapidly deteriorate ; and the same rule applies to Australia and India. I refer to this because the Australian climate has been advised in phthisis. The voyage there may be of immense advantage ; but the air of Australia itself, from the excessive fluctuations in its temperature, cannot be regarded as otherwise than objectionable ; whilst that of Tasmania and New Zealand, which although somewhat warmer, approaches in character to the climates of these islands both in humidity and low ranges of temperature, may be considered as well adapted to persons predisposed to consumption. Statistical evidence is, no doubt, wanting on this subject ; but long-continued observation, and a careful survey of the physical character and constitution of the inhabitants of the several regions of

the globe, have convinced me of the marvellous influence which the ocean exerts in maintaining the vigour of the inhabitants on the adjacent land.

2. *The Medicinal*.—This division of the treatment of consumption consists not so much in relieving the malady itself as in attention to those superadded disorders which almost invariably accompany it. For the treatment of this disease, strictly so called, the hygienic rules previously laid down constitute the chief remedy; and it is this circumstance, so well understood by those medical impostors termed “homœopathic doctors,” that has enabled them to palm off some of the silliest delusions ever practised upon a confiding public,—“*populus vult decipi et decipiatur*.” Good, however, has arisen from this apparent evil; for it has taught people that the science of medicine consists not so much in the profuse administration of drugs as in attention to those laws of our being by which not only is disease prevented, but health likewise restored. Cases constantly come under our notice where the knavish wisdom of these practitioners is keenly shewn by advising their patients to resort to the sea-side and take their precious globules, well knowing the mar-

vellous influence of the former, and ready to apply its useful results to the credit of the latter.

I refer to this subject because it is now very generally understood that the medicinal treatment of this disease is in many respects of secondary importance to the hygienic, except when superadded symptoms render the former necessary. When this is the case, a twofold skill is needed successfully to combat them; for we have a twofold disorder to cure, viz., the constitutional as well as the super-added symptoms. It is, therefore, of no ordinary importance that medicines should be ably used; for if the adjunctive signs, as they arise, be not judiciously treated, the malady itself is sure to advance.

There is one remedy, however, *cod-liver oil*, which may be considered essentially a constitutional one, or rather as an article of diet as well as a medicine; but in whichever way it be viewed, it is evident that the effects of this valuable agent are mainly to be ascribed to its fatty element contributing to, and assisting in a marvellous manner, the assimilative process. There are a variety of modes in which this may be administered. I have usually found it most

agreeable to take it in a mixture of nitro-hydrochloric acid and syrup of orange-peel, which is also preferable to orange wine (a common vehicle), because it is less likely to disorder the stomach, and moreover, like most acids, tends to promote the digestion of food; or the phosphoric may be used, with the syrup or tincture of orange-peel. It may also be given in a mixture of quinine and iron, or with some of the vegetable bitters. Sometimes it is taken best in coffee, milk, a little sherry wine, in water, or alone. For an adult it is best to begin with a dessert-spoonful twice a day, and gradually increase it to one or two table-spoonfuls, and take it immediately after the principal meals, breakfast and dinner. At these times it blends with the food already in the stomach, and the powers of this viscus being fully called forth for the digestion of the food, it is more easily assimilated. The oil also appears to be more readily disposed of, and the risk of nausea diminished, by its being converted into an emulsion by shaking each dose with the mixture in a bottle holding about two or three ounces. To a child from five to seven years old, a tea-spoonful twice a day may be given, beginning with a smaller



dose, and gradually increasing it to two. Sometimes it can be taken only once a day, at others three times are not objected to ; we must therefore adapt the remedy to the constitution and capabilities of the patient.

Having now mainly disposed of the treatment of this disease, strictly so called, by laying down the hygienic rules, and in the administration of cod-liver oil, it is proposed to treat individually the more prominent coexisting symptoms.

1. *The Debility*.—This likewise, although best combated by the hygienic rules already enjoined, viz., abundant exercise in the open air, free ventilation, a generous diet, etc., still there are a variety of medicines, such as the preparations of iron, or a combination of these with quinine ; the vegetable bitters with acids, and occasionally with alkalies ; the preparations of iodine, etc., which by promoting the digestion of food, and assisting in the formation of the red particles of the blood, will aid materially in invigorating the system, and thus arresting the disease ; yet it is not only useless, but absolutely injurious to *over-drug* a patient ; and unless there be some indication to fulfil, or symptom to alleviate,



it is best to depend chiefly upon the hygienic rules already enumerated.

2. *The Cough*.—This is one of the earliest, and, as the disease advances, one of its most constant and distressing symptoms. When it is dry and hacking, as in the first stage, it is best relieved by counter-irritants beneath the clavicle ; a blister the size of a crown-piece, or a little larger, is very efficient, and of this extent produces but little constitutional disturbance, and is seldom objected to ; or if a milder remedy be sufficient, a mustard-plaster may be used, or an embrocation of croton-oil and soap liniment, in the proportion of one part to three, should be applied over the same part for about ten minutes at bed-time ; or one of strong acetic acid and oil of turpentine intimately blended by the aid of the yelk of an egg, or mucilage, can be rubbed over any part of the chest where there is pain, till smarting is produced.

It is very desirable, at this early period, to avoid the depressing influence of sedatives, and endeavour to relieve the cough by removing the local congestion and improving the general health ; but if these should prove ineffectual, and the disease advance

towards the second stage, then the preparations of morphia, or sometimes of opium, may be given, combined with other sedatives or expectorants, according to the judgment of the practitioner. I have found the following combination very useful; and by gradually increasing the dose until each ingredient is doubled, the effect may be kept up for some time: *R* Morphiæ hydrochlor. gr. iss.; ext. conii; ext. hyoscyami, āā grs. xii; pil. scillæ co. 3ss. *Misce et divide in pilulas xii. Harum sumat i vel ii omni nocte.* The hemlock and henbane seem to promote the effect of the morphia, and the compound squill pill to facilitate the expectoration in the morning. As a rule, expectorants alone are of very little service; for the cough depending upon structural lesion of the lungs, and with it a secretion of mucopurulent matter, it is only in proportion as we improve the condition of the system, and the restorative process proceeds, that it will subside. During, however, periods of local and constitutional irritation, it is of the highest importance to relieve this by the administration of sedatives or opiates, which may be varied from time to time, according to the condition of the patient and stage of the disease.

Occasionally a soothing and agreeable effect is produced by the inhalation of the vapour of hot water, which may be medicated by the addition of two or three drams of the tincture of henbane or hemlock, or about twenty drops of hydrocyanic acid of the *British Pharmacopœia*, or of chloroform; care, however, is required in the use of these. When the cough is complicated with bronchitis, pneumonia, or pleurisy, the superadded disease must be treated by remedies adapted for each, taking into full consideration the debility of the patient and the nature of the primary disorder.

3. *The Expectoration.*—Although this subject is intimately related to the last, I refer to it especially, because we are constantly asked by patients whether something cannot be done to diminish it. In the healthy condition of the lungs and bronchial tubes, the secretion of mucus is just sufficient to protect the delicate epithelial lining of these structures, and there is little or nothing to expectorate; but when tubercle becomes deposited in the lung-substance, and is a source of irritation, the cough, which is an effort to remove this, denudes the air-tubes of their normal secretion, and exposes them unduly to the

atmosphere. With a view to remedy this, kind nature causes an increase merely of this secretion ; but after a time, should the disease progress, and ulceration take place in the lungs, pus is added to the secretion, and it becomes muco-purulent ; the pus being thrown out for the same object as the mucus, viz., to shield the delicate and ulcerated structures from the contact of the atmosphere. It is unwise, therefore, to attempt to do much to diminish the quantity of these by the aid of expectorant medicines ; for when this is done, the cough and constitutional irritation are rather increased than otherwise. Our chief aim should be to restore the general health, and assist the reparative powers ; and if we are fortunate enough to accomplish this, the expectoration is sure to diminish.

4. *The Hæmoptysis*.—Associated with the cough, although sometimes preceding it, we have hæmoptysis. The cause of this, in the earliest stage of the disease, is local congestion, arising from the tubercular deposit impeding the transit of blood through the capillary vessels ; and at this time it is often attended with a marked relief of the symptoms, but at a later period it is usually the result of a break-

ing up of the tubercular matter, with ulceration and disintegration of the lung-tissue itself; and is, therefore, a most unfavourable symptom, and usually indicates the rapid progress of the disease. When small in quantity, the treatment should consist in keeping the body in a state of moderate tranquillity, the use of mild aperients, cooling acidulous drinks, and sedatives to allay the cough. When the quantity is greater, the most rigid quietude must be enjoined, the body should be raised, and everything taken cold; and in addition, opiates with astringents, such as sulphuric acid, acetate of lead, or tannin, administered. But taking into consideration the pathological condition of the lungs, which is the cause of the hæmorrhage, and that this is the result of a deficient nutrition of the system, these remedies can only be considered as palliative; as soon, therefore, as the active stage has passed by, our attention should be directed to the improvement of the faulty assimilation, and in the administration of everything calculated to restore the health.

5. *The Dyspepsia*.—This is one of the most constant and distressing disorders connected with

phthisis, and its symptoms are of a most varied kind. I am convinced, however, that these are brought on in very many instances by the well-meaning but usually unsuccessful attempts to restore the health and improve the strength by the too frequent administration of food.

The class of persons who suffer from phthisis are, as a rule, peculiarly liable to indigestion; so much so that in very many instances it can scarcely be regarded as less than a primary, or at least a powerfully exciting cause. Taking into consideration, therefore, what will scarcely be denied,—that a small quantity of food properly digested is more likely to nourish the body than a larger amount when this process is imperfectly performed, and that its proper assimilation is essentially dependent on maintaining the whole of the digestive organs in a healthy condition, which can only be secured by keeping up a due balance between the quantity of food given, and the capabilities of the stomach to digest it; and also whether the quality of the food be crude, and difficult of solution, or the quantity too great or too frequently taken, we are sure to have as a consequence gastric irritation with all its

varied symptoms, such as flatulence, acid eructations, gastralgia, etc., accompanied by that peculiar acid condition of the stomach which has been found so frequently to exist at *post-mortem* examinations, and which Dr. Hughes Bennett considers as the true cause of phthisis,—we have, I am persuaded, in its appropriate treatment, one of the most powerful means of arresting pulmonary phthisis.

Whilst on the subject of diet, I entered somewhat fully into that part of the management of dyspepsia which has reference to this. I must therefore direct attention to pages 250-1-2-3-4, for my views on that question, and limit my remarks at present to the medicinal treatment of the chief symptoms of disordered digestion, nearly all of which arise from the same cause, viz., the want of a due balance being maintained between the powers of the stomach and the food given it to digest; for because the system is weak, forgetting that this viscus is weak also, it is often attempted to remedy it by giving an additional quantity of food, which to a stomach already debilitated is sure to produce disorder. Our attention, therefore, should be directed to restoring this viscus to a healthy condition, which



will contribute more than any other means to the cure of this disease ; and when symptoms of gastric disturbance arise, they should be relieved by appropriate medicines ; recollecting that the chief remedy is to give the stomach as much repose as possible, consistent with supporting the nutrition of the system ; and all that is needed in many instances is a moderate abstraction from the usual quantity of food, which should be at the same time highly nutritious, easy of digestion, and not too frequently taken. To relieve the acidity, small doses of bicarbonate of potash, with ten or fifteen minims of tincture of henbane may be taken three times a day, or the alkali should be combined with a little compound spirits of ammonia, and when this symptom is relieved the ammonia may be given with some of the vegetable bitters to promote the digestive powers ; or these latter conjoined with the mineral acids, or the acids given alone, and frequently no remedies promote digestion, or even correct acidity so much, as acids, especially the nitro-muriatic and sulphuric. If the gastric irritability be associated with vomiting, the hydrocyanic acid is often most useful, and when there is great pain, it should be



given in combination with opium, or the latter may be conjoined with chloric ether ; at the same time a mustard plaster should be applied over the epigastrium, whilst, for the flatulence, a little ether may be combined with ammonia, or some other stimulant or cordial, according to the judgment of the practitioner.

6. *The diarrhœa.*—When the indigestion is complicated with diarrhœa, which, if it continues, is usually sooner or later the case, for the imperfectly digested food passing through the pylorus into the duodenum and small intestines, becomes a source of irritation, and diarrhœa in its simplest form is produced, which is merely an effort of nature to relieve the intestines of their undigested contents ; all that is required is to gently aid the operations of nature, or if these be protracted or in excess, to soothe the bowels with mild opiates and cordials, or astringents : and at the commencement of the disorder these will generally suffice ; but if the malady has proceeded to the second or third stage, and there is a probability that the cause of the diarrhœa is the deposition of tubercular matter, accompanied by ulceration of the lining membrane of the in-

testinal canal, then every remedy that is administered can be considered as a palliative only, for this condition of the intestines is usually the precursor of rapid dissolution.

7. *The Hectic Fever.*—This is first of an intermittent, then of a remittent, and lastly almost of a continued character, and is attended with an amount of emaciation and debility proportionate to the extent and duration of the disease.

The system, it is well known, is supplied with two sets of nerves, the cerebro-spinal and the sympathetic, the former presiding over the functions of animal life, the other over those of the organic or vegetative, the centre of the latter being the series of ganglia extending along the sides of the vertebral column from the head to the coccyx, which, after communicating with the other nerves immediately at their exit from the vertebral canal, create branches of distribution which accompany the arteries that supply the different organs and form communications around them, called plexuses; these take the name of the artery with which they are associated, accompany them to their minutest ramifications, and regulate the supply of blood to

the capillaries through which the varied operations of nutrition and secretion are entirely carried on.

When, therefore, any part of the body is in a state of inflammation and irritation, a larger amount of blood and nervous influence is directed to it, and a proportionate quantity being abstracted from others, the tonicity of the capillaries throughout the body, which is dependent upon a due supply of this influence, is lost or impaired; hence we have the flushed cheek, the alternately cold and hot extremities, and during sleep, when the stimulus of the operations of the cerebrum is suspended, that distressing symptom termed night sweats.

The great object, therefore, in the treatment of these symptoms should be to relieve the local irritation and restore the general health, and all our remedies that are not directed to these ends, can be regarded only as palliatives; nevertheless it is highly desirable to diminish, in every possible way their debilitating effects. To relieve the *night sweats*, therefore, sulphuric acid in small doses, with or without a vegetable bitter, should be given, which, by stimulating the nerves of the stomach, and imparting a healthy tone to that viscus, not

only operates as a powerful tonic to the system generally, but also, through the medium of the great sympathetic, excites to contraction the remotest capillaries, relieving the fever and greatly mitigating this symptom; this seems to be the only way that we can explain the well-known operation of this and several other internal remedies, such as the oxide and other preparations of zinc, etc. It is most important, also, that the sleeping apartment should be well ventilated, and that the bed clothes be not heavy.

I have thus given a summary of the treatment of the more important symptoms of this disease; others might be enumerated, but, as I have before stated, my desire has been not to extend the work, but rather to abridge it as much as possible consistent with its objects.

THE END.

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